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Wright-Patterson Air Force Base, Ohio

DELIBERATE FILTERING OF UPWARD COMMUNICATION AND AWARENESS OF SELF AND OTHERS IN AIR FORCE SUBORDINATE-SUPERVISOR DYADS

David J. Boyles, Captain, USAF
Harvey L. Wicker, Captain, USAF

LSSR 26-77B

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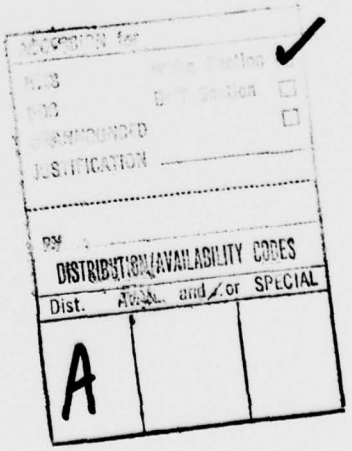

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The purpose of this research was to determine if awareness of self and others in subordinate-supervisor dyads within a United States Air Force organization could reduce deliberate filtering of unfavorable information by the subordinate. Two situations were tested. The first situation addressed newly formed relationships while the second addressed pre-established relationships. Techniques were devised to measure subordinate to supervisor communication and to develop awareness of themselves and each other. Research results confirmed the presence of filtering of important and unfavorable information. Use of an awareness treatment did not appreciably affect the communication of unfavorable information. However, significant differences as a result of the awareness treatment were discovered in the amount of important, not unfavorable, and total information passed by subordinates to their supervisors.

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DELIBERATE FILTERING OF UPWARD COMMUNICATION AND AWARENESS OF SELF AND OTHERS IN AIR FORCE SUBORDINATE-SUPERVISOR DYADS

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

David J. Boyles, BS
Captain, USAF

Harvey L. Wicker, BS
Captain, USAF

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This thesis, written by

Captain David J. Boyles

and

Captain Harvey L. Wicker

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

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COMMITTEE CHAIRMAN

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CHAPTER I

INTRODUCTION

> Communication is universally regarded as the essential social process, the means by which man achieves his individual humanity and maintains social relationships [2:4].

The communications process is a natural function in the daily interaction of humans. This interactive process is often taken for granted. The importance of the transfer of understanding and meaning in a message cannot be overemphasized, and yet this sector of communication is frequently the most neglected. The necessity for accurate communication is equally evident in organizations as well as in interpersonal relationships. As Chester I. Barnard stated, "The first function of the executive is to develop and maintain a system of communication [28:7]."

Problem Statement

Filtering of information occurs in all organizations. The vast amount of information available to be communicated upward may be too cumbersome for management to effectively deal with. Therefore, subordinates are expected to filter the information and communicate only that which is important and relevant to their supervisors. However, filtering and deliberate distortion of information potentially harmful to

the subordinates also occur. This additional filtering and distortion are referred to as the MUM effect (Mum about Undesirable Messages) (34:184).[1] The MUM effect prohibits managers from obtaining all the pertinent information necessary to effect accurate decisions. Consequently, their decisions, which are based on incomplete information, may be incorrect. To reduce the willful distortion of information, the MUM effect must be understood, and a technique identified which can be used to lessen its occurrence.

Justification

Man's need to communicate has been defined many times over. For the sake of a common definition, the following is presented: "By communicating, we mean the flow of material, information, perceptions and understanding between various parts of an organization [13:3]." The aforementioned "organization" may be as small as two communicators or as large as the United States Air Force. In organizations, the communication process is generally defined to be either horizontal or vertical in structure depending on whether a functional or scalar principle of job classification is employed (12:114). The Air Force, as in the case of most large bureaucracies, depends heavily

---

[1] MUM effect: the act of distorting upward communication by a subordinate through the intentional filtering of information which reflects unfavorably upon the subordinate.

on the scalar classification. When considering communication within the Air Force, most thought centers around information flow up and down the chain of command. The necessity of an accurate line of communication to top levels of management is summarized in the following statement:

> Integrity--which includes full and accurate disclosure--is the keystone of military service. Integrity in reporting, for example, is the link that connects each flight crew, each specialist and each administrator to the commander-in-chief. In any crisis, decisions and risks taken by the highest national authorities depend in large part, on reported military capabilities and achievements. In the same way, every commander depends on accurate reporting from his forces. Unless he is positive of the integrity of his people, a commander cannot have confidence in his forces. Without integrity, the commander-in-chief cannot have confidence in us.
>
> Therefore, we may not compromise our integrity--our truthfulness. To do so is not only unlawful but also degrading. False reporting is a clear example of a failure of integrity. Any order to compromise integrity is not a lawful order.
>
> Integrity is the most important responsibility of command. Commanders are dependent on the integrity of those reporting to them in every decision they make. Integrity can be ordered but it can only be achieved by encouragement and example [27].

This example is not cited to point up the faults inherent with a lack of integrity, but rather to recognize the importance of accurate disclosure of information in a large hierarchical organization. Of the two directions of communication flow inherent in the vertical structure, this research is limited to the investigation of upward disclosure of information.

It has been noted in numerous research studies (2:439) that a subordinate will not pass all information

that transpires at his level on to his supervisor. Some filtering is beneficial in trimming unimportant data while other filtering may be undesirable. Three barriers to communication that help to explain how undesirable filtering occurs are:

> 1. Barriers arising from the fact that individuals are involved in communication--and individuals differ. These might be called pre-existing barriers to communication, which a company inherits because they are common to society.
> 2. Barriers arising from the company's "climate," or atmosphere, which tends to stultify communication.
> 3. Barriers that are largely mechanical in the sense that they stem from lack of proper facilities or means of communication [31:151].

In a subordinate-supervisor dyad, the climate of interpersonal trust, awareness, and confirmation will affect the degree of information distortion, or the MUM effect (34:184). If the climate is supportive, the MUM effect will be reduced and accurate information will pass from the subordinate to his supervisor (31:154). Within a defensive climate, the opposite case is observed.[2]

This research effort is directed toward understanding the relationship between awareness of self and others and the MUM effect by evaluating an awareness technique to

---

[2]This case is simplified for understanding. In actuality, supportive and defensive are extremes on a continuum. Relative degrees of these two factors are located in between the extremes. It may be stated that a supportive climate is more conducive to the free flow of communications than is a defensive climate.

reduce the MUM effect and hence, improve upward communication. The potential, ultimate rewards from such an improvement are many and include:

> 1. Management gets an improved picture of the work, accomplishments, problems, plans, attitudes, and feelings of subordinates at all levels.
> 2. Before becoming deeply involved, management spots individuals, policies, actions, or assignments which are likely to cause trouble.
> 3. By helping lower echelons of supervision to improve their selection of those things that are to be communicated upward, management gets them to do a more systematic and useful job of reporting.
> 4. By welcoming upward communication, management strengthens the only device for tapping the ideas and help of its subordinates. This gives management a better answer to its problems and eases its own responsibility.
> 5. By opening the channels upward, management helps the easy flow and acceptance of communications down [25:370].

Objectives

There were two specific objectives for this research. The first objective was to measure the effects of awareness of self and others on the amount of deliberate distortion of upward communications within a subordinate-supervisor dyad. Specifically, this research sought the answer to the following question: Will the deliberate distortion of upward flowing information, perceived as unfavorable to a subordinate, be reduced by increasing the awareness of a subordinate about himself and his supervisor?

The second objective was to evaluate an awareness technique designed to aid organizational managers in improving the accuracy of upward communications.

CHAPTER II

LITERATURE REVIEW

The review of pertinent literature first describes relevant communication models from Aristotle to the present. Then a selected communication model is introduced to explain organizational communication. Next, organizational climate, which improves or hinders communication, is defined as supportive or defensive. The final area examined is current research on the deliberate distortion of upward communication.

Communication Models

Aristotle is credited with the first model of the communication process. Aristotelian communication was known as rhetoric, and its goal was persuasion. The model consisted of a sender, receiver, and the message (20:107).

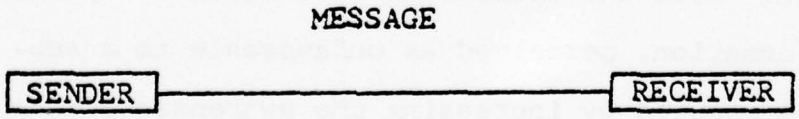


Figure 1. Aristotelian Model

Aristotle's model was the only recognized communication model for nearly 2300 years. Then as the electronic age came into existence, so did additional communication models.

The Shannon-Weaver Model (12:20), shown in Figure 2, expanded the Aristotelian Model to reflect the current concept of communication, and this concept paralleled the development of electronic communication as evident by this model.

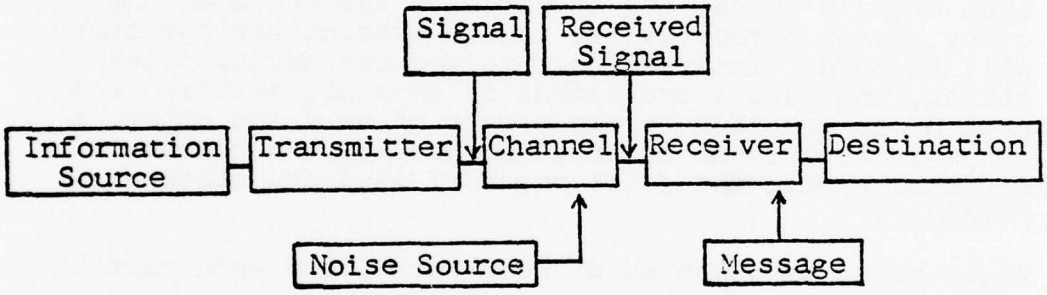


Figure 2. Shannon-Weaver Model

In the Shannon and Weaver Model, the emphasis is on the source transmitting a signal to the receiver who interprets it as a message. A key element, noise source, is a potential source of inaccurate communication. However, noise is largely considered to be a physical phenomenon. The model did not specifically address the human aspect of communication. A more explicit, taxonomic model of communication involving human behavior is the Berlo Model.

The Berlo Model attempted to identify, label, and describe the components that make up communication. In

addition, the model viewed communication as a relationship between the source and receiver with the receiver determining the effectiveness of the communication. Berlo believed that communication is purposeful and that "all communication behavior has as its purpose the eliciting of a specific response from a specific person [6:21]." Not only was communication viewed as a relationship, but as an empathic interaction:

> When two people interact, they put themselves into each other's shoes, try to perceive the world as the other person perceives it, try to predict how the other will respond. Interaction involves reciprocal role-taking, the mutual employment of empathic skills. The goal of interaction is the merger of self and other, a complete ability to anticipate, predict and behave in accordance with the joint needs of self and others [6:22].

The Berlo Model is composed of four parts, and each part is characterized in Figure 3. Although the model does not show feedback or a response to the initial message, Berlo does address the process of feedback occurring during the communication process (6:21).

S Source	M Message	C Channel	R Receiver
Comm Skills	Content	Seeing	Comm Skills
Attitudes	Elements	Hearing	Attitudes
Knowledge	Treatment	Touching	Knowledge
Social System	Structure	Smelling	Social System
Culture	Code	Tasting	Culture

Figure 3. Berlo Model

The Wesley-MacLean Model (20:108), which does contain a feedback loop, attempted to prescribe a paradigm in which all kinds of human communication from a face-to-face situation to an international/intercultural situation are displayed. Its strengths are the feedback loop and the expansion of the model from a dyad relationship to a two-step flow of communication or mass communication when other persons are added:

> Actually the other person (C) is a "gatekeeper" or "opinion leader" who selects information from A and transmits it to B. This process could be likened to many organizational situations, if A is considered top management, C the supervisor, and B the worker. The message, obviously reaches B only after it has been filtered through other people, and message X" may not be the same as message X' [20:110].

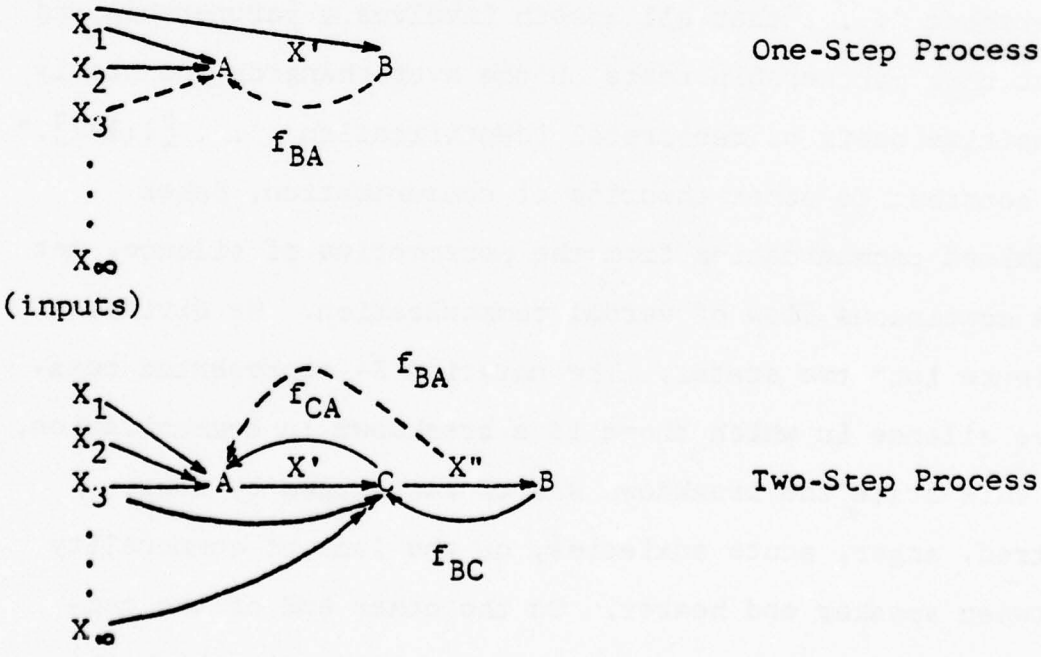


Figure 4. Wesley-MacLean Model

A communication model that departs from the previous ones discussed is the Baker Model (1:145). It is based on two assumptions. The first assumption is that man does not communicate in a vacuum. If he talks, writes, or reads, it will be to someone if only to himself. The second assumption is that the general effectiveness of communication is related to the degree of commonality which exists between the speaker and hearer. In order to have effective communication, both the speaker and listener must identify with each other. Baker represented these degrees of commonality, or "reciprocal identification," with the two circles labeled A and B in Figure 5.

Baker summarized his first two assumptions with the statement ". . . that all speech involves a partnership and that this partnership rests on the ever-changing and highly sensitive basis of reciprocal identification . . . [1:147]." In contrast to other theories of communication, Baker examined communication from the perspective of silence, not the continuous flow of verbal communication. He divided silence into two states. The notation S- represented negative silence in which there is a breakdown in communication. In this state the breakdown was characterized by fear, hatred, anger, acute anxieties, or the lack of commonality between speaker and hearer. On the other end of the continuum, communication occurred in situations in which tension was low and reciprocal identification or commonality

was very high. In this instance, individuals can remain comfortably silent in the presence of each other without speech in an equilibrium state. This condition was denoted by S+. Connecting the two states was a reclining triangle which reflected the increasing commonality and decreasing psychic tension as one progressed from S- to S+. Baker concluded:

> The underlying (i.e., unconscious and unpremeditated) aim of speech is not a continued flow of speech, but silence, for the state of complete equilibrium, marked by elimination of intropersonal psychic tensions, is possible only when the position S+ in the speech field has been reached. This silence in which arguments and contention, whether expressed or not, have vanished, to be replaced by understanding acceptance on the part of the speaker [1:166].

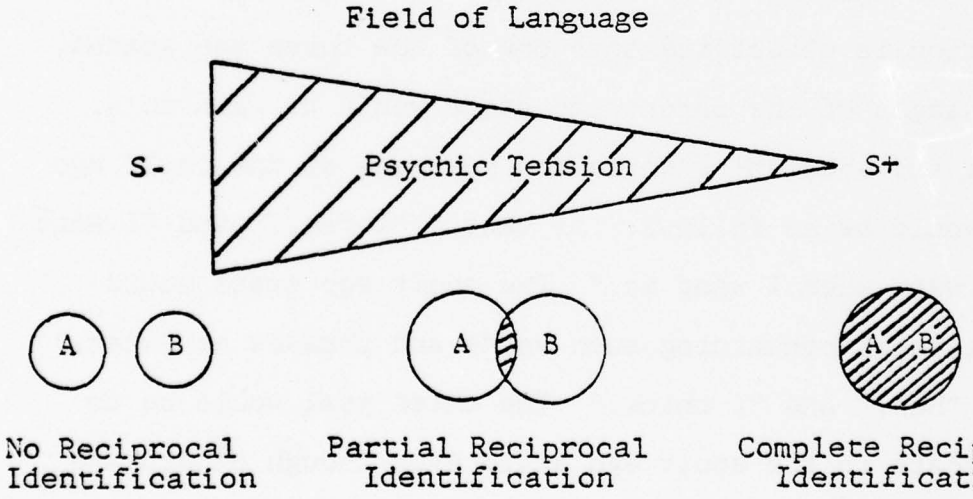


Figure 5. Baker Model

Another different approach to form a communication model is the Transactional Analysis (TA) Model (12:177).

Basically, it is concerned with the type of communication flow between individuals and the participants' motives. The type of communication is subdivided into three parts called ego states. The parent ego state contains messages that are critical, nurturing, and prejudicial. The parent ego state represents authority figures such as teachers, supervisors, and parents. While on the opposite end of the continuum, the child ego state contains messages which reflect childlike feelings or emotions and behavior. The remaining ego state is that of an adult. In this state the individual tends to be gathering data, analyzing it, and making decisions.

In Transactional Analysis, the content of the communication is classified into one of the three ego states. The messages of the parent ego state would contain do's, don'ts, and shouldn'ts while the messages of the child ego state would be as follows: "I want," "I feel," and "I want what I want when I want it." The adult ego state would have messages containing such words and phrases as "what," "why," "how," and "I think." The chief goal would be to communicate in the adult ego state even though others are communicating in the child or parent ego state. Communicating in the adult ego state will entice other individuals to communicate in the same ego state thus achieving better communication. In addition, the motives for communicating were labeled strokes which may be positive or negative.

For example, a positive stroke might be praise for a job well done while criticism could be viewed as a negative stroke.

Examples of some possible patterns of communication are diagrammed in Figure 6. The purpose of Transactional Analysis is to recognize the types of messages and their motives and to understand their meaning and purpose which may enable individuals to communicate more effectively (22:214).

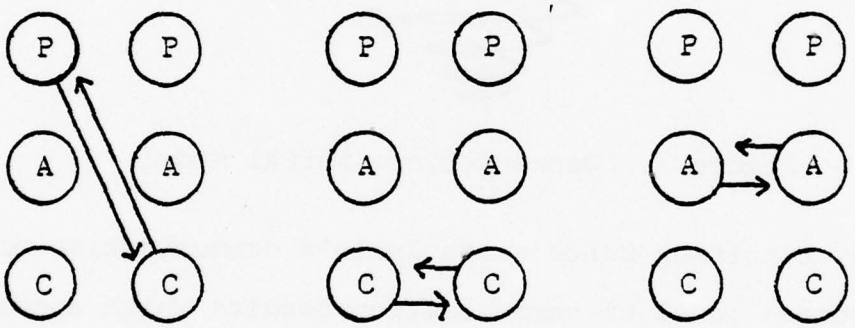


Figure 6. Transactional Analysis Model

Up to this point, all the models examined have been a one- or two-step linear process, but in reality is this always the case? According to Dance, "Communication is constantly moving forward and yet it is dependent to some degree upon the past, which informs the present and the future [7:295]." For example, a communication event between two individuals today will have some effect on

conversations and actions that could occur at a later time. The memory of past communication influences future communication. In addition, continuous feedback and new communication events suggest that the communication process is circular, not linear. Dance's Model (7:296) attempts to combine desirable features of all communication models into a helix as shown in Figure 7.

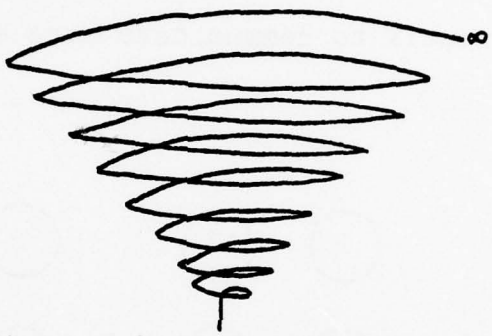


Figure 7. Dance Helical Spiral Model

By combining Dance's and Berlo's communication models, a process model of communication results which appears to be the most comprehensive and specific model of communication today. This synthesis of models is represented by the Tubbs Communication Model (34:23). The Tubbs Model (Figure 8) defines a communication cycle which continues through time. It begins with one or more communicators. There may be one communicator, an individual who originates and perceives his own thoughts. This is known as intrapersonal communication. When there are two communicators, it is a dyad referred to as interpersonal communication. The combination of more than two communicators is labeled

person-group communication. The Tubbs Model is applicable to all three situations, but for description, only the dyad will be discussed.

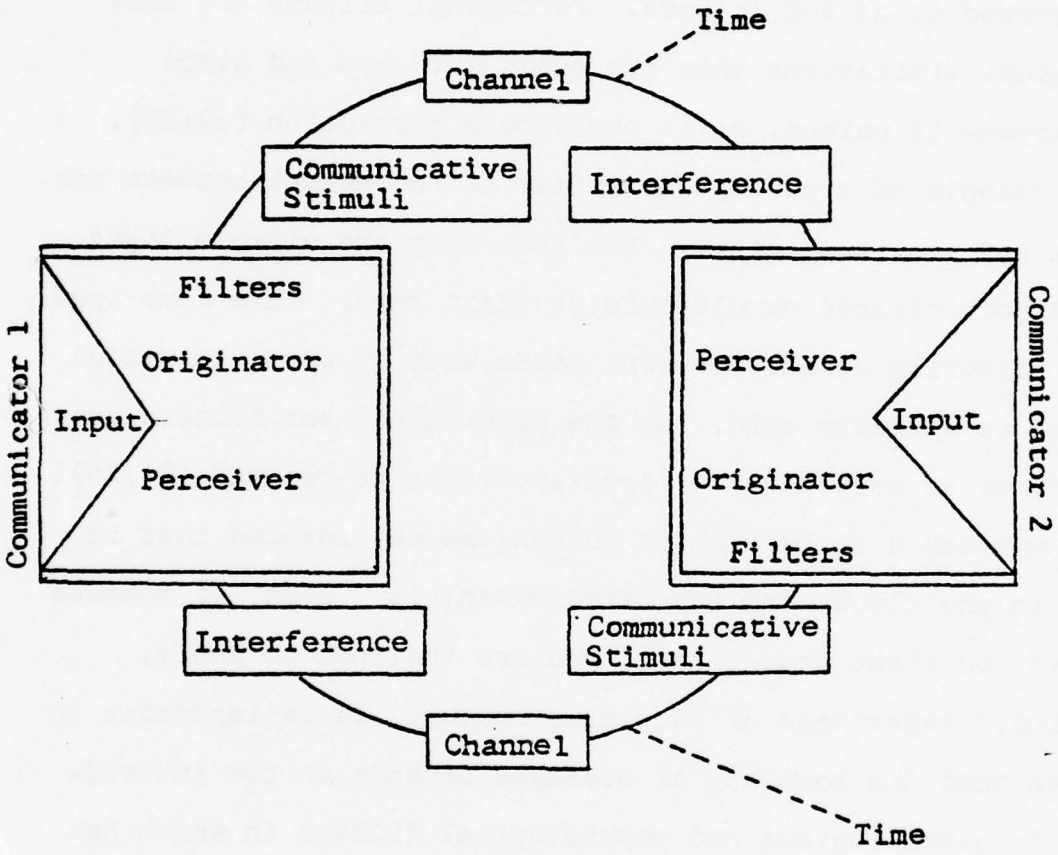


Figure 8. Tubbs Model

First, inputs are needed and they may originate within an individual or from the outside. For example, an individual may feel that the room is too cold and communicates this feeling, or he may think of an idea that would save his company millions of dollars and attempts to

communicate the idea to his supervisor. Secondly, filters are "a limit on our capacity to sense or perceive stimuli [34:26]." Filters are of two types: physiological, referred to as perceptual filters and psychological, referred to as set filters. Perceptual filters are biological limitations that are built into man and since everyone is unique, so is everyone's perception (34:26). An example of a perceptual filter is the bridge between visual and nonvisual light. Man sees only the visible light and not infrared or ultraviolet light rays. This same type of filtering occurs when one hears what he wants to versus what is actually said. On the other hand, set filters are defined as expectancy or predisposition to respond (34:26). If you ask a child what is heaven, he may respond that it is in the clouds and inhabited by angels. Also, if someone asks you about your health, you are inclined to reply, "Fine," regardless of your true status. It is important to note that the accuracy of messages depends on the individual's psychological and physiological filters in which he will determine which input or stimuli he perceives and how he perceives them (34:26).

Next is an attempt to communicate as a result of a communicative stimulus which is something that rouses or incites to action. The stimulus may be intentional or unintentional. In any case the stimuli may be verbal or nonverbal. Verbal stimuli involve the "spoken or written

word" while the nonverbal are commonly referred to as body language. The smile or sad expression is an obvious example of body language, but the way one walks or stands also relays meanings.

Channels are the media through which messages are transmitted. The words on this page represent the channel known as writing. In addition, face-to-face communication uses the air molecules to send vibrations from one communicator to another. Following the channel is the interference component of the communication process. Interference is "anything that distorts the information transmitted to the receiver or distracts him from receiving it [34:31]." There are two types of interference. Technical interference refers to noise or factors that cause the communicator to perceive distortion of the transmitted message. The loudness of the stereo or the communicator's speech impediment are examples. A second type is semantic interference which involves assigning different meanings to identical words or messages. Communicator 1 may say that the cause of crime is "economics" while Communicator 2 states that it is "social." They are both correct, but they label the cause of crime differently.

At this point within the communication model, Communicator 2 perceives the message in the same type of process as Communicator 1 originated it. He filters the message which generates an input and then he originates a return message or response which is called feedback. Feedback goes

through the same mechanisms as the original message: filter, communicative stimuli, channel, and interference. It is received by Communicator 1 who may or may not respond, which is feedback in any case. This process may stop here or continue, but the communicative cycle as represented by Tubbs Model continues with time. Two communicators may end their conversation today, but renew it next week when they meet. This continuation is reflected as the communicative cycle extends through time (34:21-37).

In summary, comparing all the communication models discussed, the Tubbs Model is the most comprehensive and specific. It introduces the concept of communicative processes interconnected with the communicative cycle. Now let us examine this communication model within an organizational environment.

Organizational Communication

There are three generally recognized schools of organizational theories: the classical school, the human relations school, and the social systems school (12:23). Briefly, the classical school is represented by a bureaucratic hierarchy with a pyramid structure. The human relations school approaches management of its people through people-centered orientation while the social systems school views the organization as a system with numerous subsystems that are interdependent on each other. For the purpose of

this research, only the bureaucratic theory of an organization will be examined as this type of structure is most representative of Air Force organizations. Specifically, the upward communication within a dyad consisting of a subordinate and a supervisor will be the area of study for this research. Before continuing, a description of the classical theory of organization is needed.

The classical theory evolved from "scientific management" which dates back to pre-World War I. In the classical theory, man is described as:

> . . . a rational, economic being who could best be motivated at work by such "carrot and stick" techniques as piecework systems, bonus systems, time and motion studies, cost figuring systems, etc. [12:26].

The two most noted individuals who contributed to the development of the classical school were Fayol and Weber. Fayol (12:27) recommended fourteen principles of management which included the following:

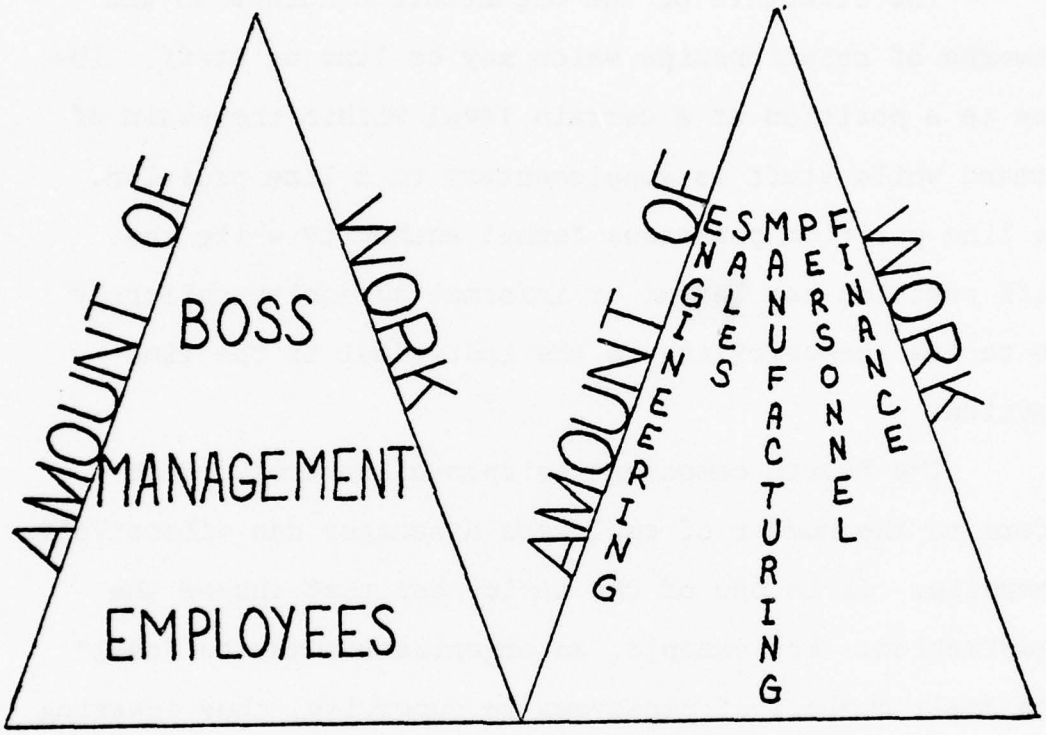
1. Division of work (specialization).
2. Authority and responsibility (power).
3. Discipline (obedience).
4. Unity of command (one base).
5. Unity of direction (one plan).
6. Subordination of individual interest to general interest (concern for the organization first).
7. Remuneration of personnel (fair pay).
8. Centralization (consolidation).
9. Scalar chain (chain of command).
10. Order (everyone has a unique position).
11. Equity (firm but fair).
12. Stability of tenure of personnel (low turnover).
13. Initiative (thinking out a plan).
14. Esprit de corps (high morale).

Weber disagreed with Fayol's definition of inherent authority, in particular, the conclusion that traditional power may have been illegitimate. Weber defined legitimate authority as earned, respected, established by norms, rational, and legal. Weber's definition of authority was the basis for his ideal form of an organization, "bureaucracy." Its characteristics as cited by Goldhaber are (12:28):

1. An organization with continuity which operates according to rules.
2. An area or domain, of competence in which the persons involved share the work toward specific goals under predetermined leaders.
3. An organization with scalar (hierarchical) principles.
4. An organization with rules which are either norms or technical rules.
5. An organization in which administrative staff is separated from ownership of production devices or administration, and private belongings and the organization's equipment are separated.
6. An organization whose resources are free from outside control, and in which no administrator can monopolize personnel positions.
7. An organization in which any administrative acts, rules, policies, etc., must be stated in writing.

By reviewing the literature and the above principles on the classical organizational theory, four key components have been identified. They are: division of labor, scalar and functional processes, structure, and span-of-control (33:28). Division of labor (33:29) refers to how the amount of work is divided among its work force. This division can be visualized by a pyramid which represents the total amount of work accomplished by the organization. It can be scalar

based on levels of authority and responsibility, or it can be functional based on the nature of the job (see Figure 9).



(a) Scalar (b) Functional

Figure 9. Division of Labor by Scalar and Functional Classification

The scalar and functional processes refer to both the vertical and horizontal growth and structure of the

organization. Scalar represents the levels of authority or chain of command and functional processes represent the specific job duty of each employee in the organization (33:30).

The structure of the organization refers to the networks of relationships which may be line or staff. The line is a position at a certain level within the chain of command while staff is supplementary to a line position. The line position possesses formal authority while the staff position has latent or informal authority primarily due to its accessibility to the individual in the line position.

The fourth component is span-of-control, which refers to the number of employees a manager can effectively supervise. It is one of the influences that shapes the organization. For example, an organization may be "tall" with small numbers of employees to supervise, thus creating many more levels of supervision, compared to a "flat" organizational shape which has a larger number of employees per supervisor and less levels of supervision.

Now that the classical organizational theory has been outlined, the question concerning how the organization communicates still remains. In answering this question, it

is helpful to refer to the paradigm of organizational communication (12:10) as diagrammed in Figure 10.

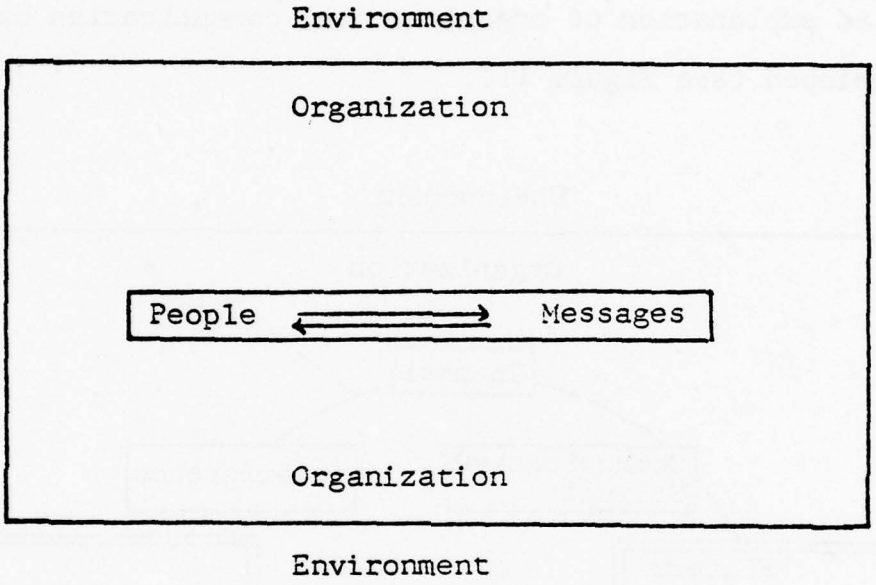


Figure 10. Organizational Communication Model

Despite a wide variety of viewpoints on the definition of organizational communication, a few common thoughts can be detected (12:11):

1. Organizational communication occurs with a complex open system which is influenced by and influences its environment.

2. Organizational communication involves messages, their flow, purpose, direction, and media.

3. Organizational communication involves people, their attitudes, feelings, relationships, and skills.

By substituting the Tubbs Communication Model (see Figure 8) for people-message flow, a comprehensive and detailed explanation of organizational communication can be developed (see Figure 11).

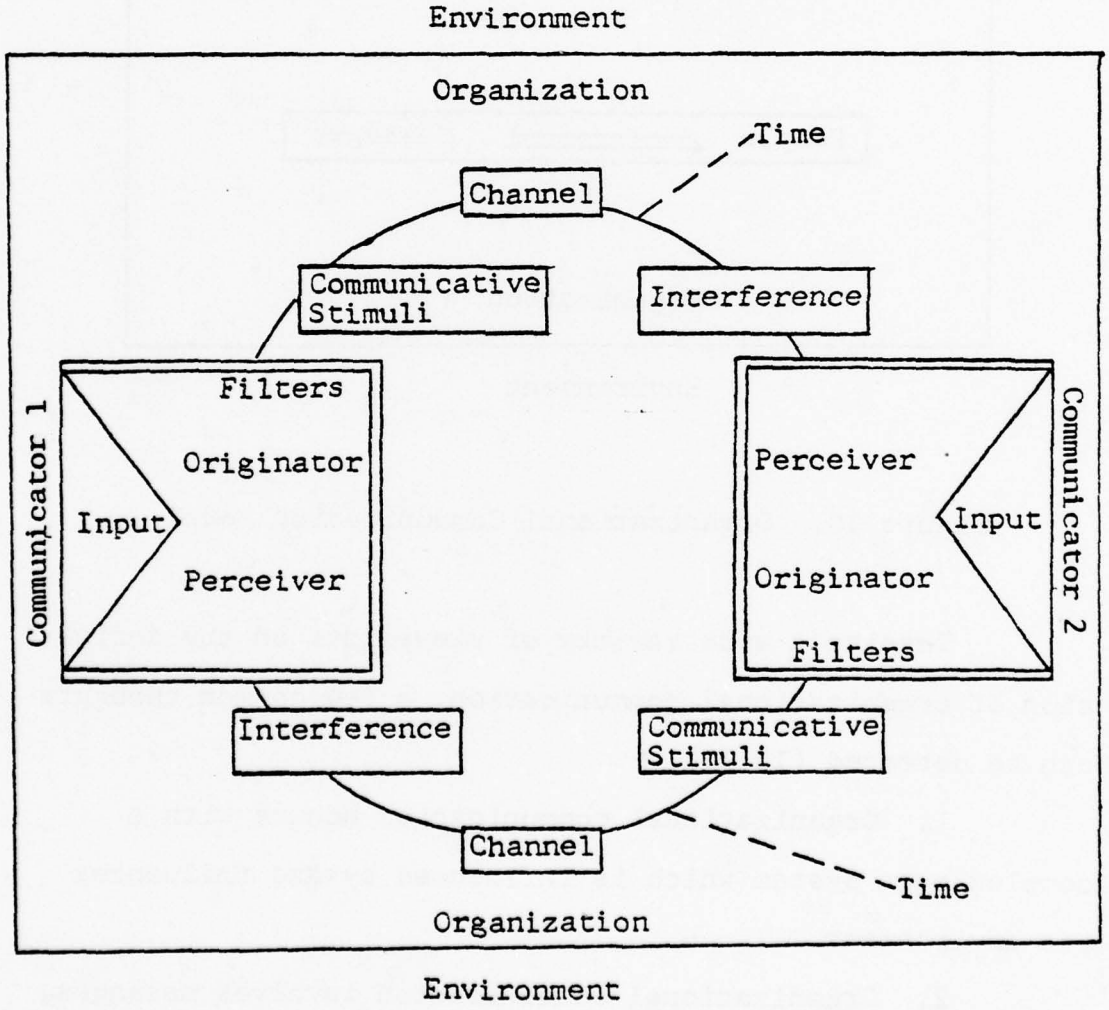


Figure 11. Paradigm of Organizational Communications

An excellent example of upward communication within a classical organization is the written and oral reporting methods used by military personnel. The military is a true bureaucracy in which there is a rigid hierarchy called the "chain of command" from the President down to the lowest ranking individuals. Authority is reinforced by the wearing of symbols of rank or uniforms. Also, the division of the work force could represent the boundary between officers and enlisted personnel. Scalar and functional processes are explicitly spelled out to designate the job responsibilities of line and staff organizations. Communication flows upward, downward, and horizontally as expected of any classical organization. With the many layers, functional groupings, and channels, distortion of communication is a distinct possibility if not a certainty. Distortion of upward communication between a subordinate and a supervisor may generate problems which in wartime could be catastrophic. The factors that affect upward communication and distortion within a dyad are described in the next section.

Organizational Climate

An organization's climate can be described as:

> A set of properties of the work environment, perceived directly or indirectly by the employees who work in the environment and is assumed to be a major force in influencing their behavior on the job [11:313].

One extremely important property of the climate is the relationship between the subordinate and his supervisor.

This relationship involves continuous communication because it is the link between management of the organization and its workers. As stated by Davis and Scott, "The relationship between the superior and subordinate is crucial in establishing a supportive relationship [8:43]." The concept of a "supportive" relationship or climate has been described by several authors. Likert concluded that a climate is supportive when a supervisor is perceived by his subordinate as:

> . . . supportive, friendly, and helpful rather than hostile. He is kind but firm, never threatening, genuinely interested in the well-being of subordinates and endeavors to treat people in a sensitive, considerate way. He is just, if not generous. He endeavors to serve the best interests of his employees as well as the company. . . . He shows confidence in the integrity, ability, and motivations of subordinates rather than suspicion and distrust. . . . His confidence in subordinates leads him to have high expectations as to their level of performance. With confidence that he will not be disappointed, he expects much, not little. (This again, is fundamentally a supportive rather than a critical or hostile relationship) [12:52].

In addition, Gibb proposed two communication climates (defensive and supporting) that promote the establishment of the organizational climate. The defensive communication climate was characterized by (10:143-44):

> 1. Evaluation (passing judgment, blaming, questioning standards, values and motives);
> 2. Control (trying to do something to another, attempting to change an attitude or a behavior of another);
> 3. Strategy (manipulation and tricking others);
> 4. Neutrality (expressing lack of concern for another's welfare);
> 5. Superiority (communicating the attitude of superiority in position, wealth, intellectual ability, physical characteristics, arousing feeling of inadequacy in others);

6. Certainty (dogmatic, needing to be right, wanting to win).

On the other hand, the supportive communication climate was characterized by the following (10:145-46):

1. Description (nonjudgmental, asking questions for information, presenting feelings, events, perceptions or processes without calling for or implying a change in the receiver);
2. Problem orientation (defining mutual problems and seeking solutions without inhibiting the receiver's goals, decisions and progress);
3. Spontaneity (straight-forward);
4. Equality (mutual trust and respect, participative planning without influence of power, status, appearance);
5. Empathy (respecting the worth of listener, identifying, sharing and accepting his problems, feelings and values);
6. Provisionalism (willingness to experiment with one's own behavior, attitudes and ideas).

In light of the above discussion, the degree of supportive organizational climate is dependent upon the degree of supportive communication climate which, in turn, is dependent upon the interpersonal relationship that exists between the subordinate and the supervisor. Therefore, in order to generate a supportive climate, the interpersonal relationship must be made more favorable. In accordance with Tubbs and Moss (34:295), confirmation, interpersonal trust, and awareness of self and others are ways of improving the relationships between individuals. These concepts are interdependent and one cannot be used to the exclusion of the other two.

As people communicate verbally or nonverbally, messages are exchanged which inform the communicators of how

they are perceived by others. For example, during a conversation between two people, a third individual approaches and starts a conversation with one and totally ignores the original speaker. Gradually the communicators depart, leaving the original speaker standing alone. This situation informs us that his presence or potential contributions to the conversation are worthless. On the other hand, a situation in which an individual is sought out to be asked his opinion recognizes the individual's worth. The latter example is one of confirmation, and it may be defined as "any behavior that causes another person to value himself more [29:295]." Confirmation implies recognition of, attention to, and, in some cases, a willingness to affiliate with the other person (19:103). The first example cited describes disconfirmation which is defined as "behavior that causes a person to value himself less [34:296]." Disconfirmation implies that the other person's communicative attempts do not warrant direct acknowledgment or denies the inherent value of another individual. Examples are listed below which illustrate the meaning of communicative responses which disconfirm or confirm (19:103-104).

Disconfirming Responses

1. Impervious response. When one speaker fails to acknowledge, even minimally, the other speaker's communicative attempt.
2. Interrupting response. When one speaker begins while the other speaker is still talking.

3. Irrelevant response. When one speaker responds in an unrelated way to what the other speaker said or introducing a totally different subject not related to the present conversation.

4. Tangential response. A "Yes, but" response which acknowledges the other speaker and then discusses his subject which had no relationship to the present conversation.

5. Impersonal response. A conversation using the third person rather than the first person statements.

6. Incoherent response. Conversation containing incomplete or rambling statements which are difficult to understand.

7. Incongruous response. When a speaker's non-verbal response is inconsistent with his verbal response. An example would be a very angry person who says that he is not angry.

Confirming Responses

1. Direct acknowledgment. One speaker acknowledges and reacts to the communication of others.

2. Agreement about content. One speaker reinforces information expressed by the other.

3. Supportive response. One speaker expresses understanding of the other.

4. Clarifying response. One speaker attempts to clarify the content of the other's message. This can be done by asking for more information.

5. Expression of positive feelings. One speaker describes his own positive feelings regarding the communication of the other speaker.

Confirming communication is one component that establishes a supportive climate. Another component is interpersonal trust, which is the next subject to be discussed.

Interpersonal trust is defined as "an expectancy . . . that the word, promise, verbal or written statement

of another individual can be relied on [34:298]." One way of illustrating interpersonal trust is by looking at game behavior. The strategies people choose when they play games furnish us some opportunity to examine the effect of varying levels of interpersonal trust on communication. The Prisoner's Dilemma (34:298) is one type of game that gives the participants the choice between competition or cooperation to increase their gains. Imagine two individuals charged with the same crime. They are placed in separate rooms and cannot know how the other will respond to the charges against them. Both individuals are aware that they can be convicted only if the other one confesses. The potential alternatives are displayed in the payoff matrix in Figure 12.

		Individual #2	
		Not Confess	Confess
Individual #1	Not Confess	1,1*	-2,2
	Confess	2,-2	-1,-1

*The first digit represents individual #1, the second digit represents individual #2.

Figure 12. Payoff Matrix for Prisoner's Dilemma

It can be seen from the payoff matrix that if trust did not exist between the individuals, they would seek their own gains by confessing and turning state's evidence. On the other hand, if they cooperate with each other and do not confess, they show trust, and they both win by going free (scoring more points). It is important to note that communication between participants was not allowed. By changing the restrictions and allowing communication between individuals, a significant increase in cooperative choices was observed (7:300). In addition, from surveys by Gibb (10:141) it was included that when trust increases, efficiency and accuracy in communication also increase.

In conjunction with confirmation and establishment of interpersonal trust, the individual must be aware of himself as well as others. One way of visualizing this concept of awareness is by examining the Johari Window Model (34:304). This model offers a way of looking at the interdependence of intrapersonal self and interpersonal relationships with others. The Johari Window (see Figure 13) is subdivided into four quadrants. The first quadrant is labeled "open." The "open" quadrant is something that the originator and others are aware of; for example, the fact that an individual prefers to read a new book instead of viewing a movie. The second quadrant is labeled "blind." In this quadrant, the individual is not aware while others surrounding him are. This is illustrated by mannerisms

of individuals which are obvious to others but unknown to the individual displaying these mannerisms. The third quadrant is labeled "hidden" because the individual is hiding a secret, known to self but not to others. An example of this quadrant would be a grade of "C" on a statistics test. The individual knows who received the "C," but others do not. The fourth quadrant is labeled "unknown," and is unknown to self and others. This quadrant would deal with the unconscious self, that which is unknown to self and hidden from others.

	Known to Self	Not Known to Self
Known to Others	Open 1	Blind 2
Not Known to Others	Hidden 3	Unknown 4

Figure 13. The Johari Window

The ideal goal for improved interpersonal relationships is to expand quadrant one and reduce the size of the remaining quadrants (22:304). This knowledge of self and others enables an individual to develop empathy, the ability to identify with others, and aids in the generation of a supportive climate.

Now that the basic elements of a supportive climate have been examined, it is necessary to review the deliberate distortion that can occur in upward communication between a subordinate and a supervisor.

Distortion of Upward Communication

During the recent war in Southeast Asia, South Vietnamese military efforts appeared more successful on paper than in practice. For example, the Vietnamese officers were reporting considerably more progress to their superiors than actually existed (34:184). This type of distortion by a subordinate to a supervisor is referred to as the MUM effect (Mum about Undesirable Messages) by Tubbs and Moss. The MUM effect is defined as (34:184) ". . . distorting what they say to their superiors in order to create the most favorable impression possible" and ". . . they create a filter through which only the more pleasant information passes."

There is a definite difference between filtering the information flow as required within the organization and the deliberate filtering of undesirable information by a subordinate. In any organization, the quantity of information must be condensed to a workable amount. This filtering is done without bias, and it is expected by the supervisor. On the other hand, the MUM effect involves the deliberate filtering and distortion of upward communication which would reflect unfavorably upon the subordinate. Here, filtering

is the intentional omission of data and altering of information. In short, upward communication has been deliberately distorted by the subordinate for the purpose of placing himself in a more favorable position with his supervisor.

In a dyadic relationship, the temptation to distort messages by filtering information and thus put oneself in a favorable light is especially great for the person who occupies the lower status position. A possible reason for distortion was offered by Gemmill when he stated:

> If a subordinate believes that disclosure of his feelings, opinions, or difficulties may lead a superior to block or hinder the attainment of a personal goal, he will conceal or distort them [9:88].

Read (25:5) found in a study of fifty-two subordinate-supervisor pairs in three companies that the accuracy with which subordinates disclosed their difficulties to supervisors was negatively related to their desire for upward mobility. In addition, it was reported by Barnlund (2:455) that the stronger the mobility aspirations of the subordinate, the less accurate would be his communication of problem-related information to his immediate supervisor. Mobility aspiration is not the only factor that influences the distortion of upward communication. Interpersonal trust of the subordinate for his supervisor and the subordinate's perception of his supervisor's influence over that subordinate's career were cited by Mellinger and Pelz

respectively (2:456) as having a direct effect on the accuracy of upward communication.

The current research has concentrated upon the effects of trust and individual's mobility on upward communication (23:5). Of the elements of interpersonal relationships which affect the accuracy of upward communication, trust has been the dominant area for research. O'Reilly (23:24) and Goldhaber (12:287) have suggested that additional research be conducted to identify other relationships between distortion and organizational communication. The purpose of this research is to add new knowledge concerning the relationship between awareness (of self and others) and upward communication.

Research Hypotheses

Two research hypotheses were developed:

1. Within a newly established relationship, subordinates who are aware of self and their supervisors communicate more information to their supervisors that is potentially unfavorable to themselves.

2. Within an existing relationship, subordinates who are aware of self and their supervisors communicate more information to their supervisors that is potentially unfavorable to themselves.

The two hypotheses differed only with respect to the existence of a prior established working relationship

between the subordinate and the supervisor. The first hypothesis addressed the dyads that were unaware because of the lack of prior association. Support for such a hypothesis, by itself, would limit the application of the research to only those dyads characterized by a newly formed working relationship. Therefore, the second hypothesis addressed previously formed dyads with an established working relationship. Any differences or lack of differences in support of the two hypotheses would then indicate the effect of a prior working relationship.

CHAPTER III

METHODOLOGY

General Approach

A laboratory experiment was designed to determine if subordinates who are aware of self and their supervisors communicate, to their supervisors, more information that is potentially unfavorable to themselves than do subordinates who are not aware. United States Air Force officers, playing the roles of supervisor and subordinate in a dyadic relationship, were divided into experimental and control groups. Dyads in the experimental group were treated with an awareness exercise and posttested while the control group dyads were posttested only.[1]

Research Design

Posttest Only Control Group Experimental Design (3:25) was selected (see Figure 14). This design allowed the generation of data necessary to test both research hypotheses and minimized the number of subjects required. In addition, the research design incorporated the structure of the Paradigm of Organization Communications presented in

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[1]The posttest was an instrument which was designed to measure the amount of information communicated by a subordinate to his supervisor.

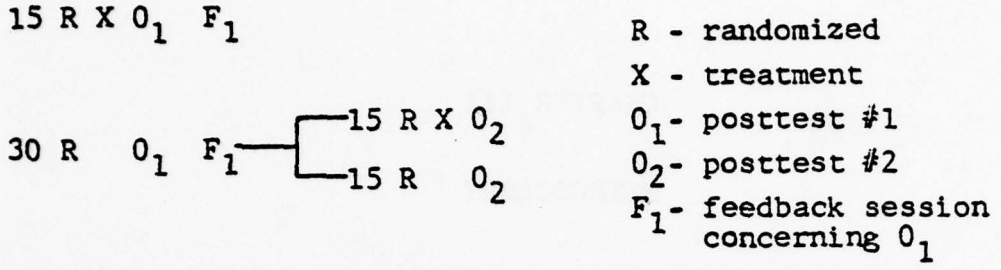

Figure 14. Research Design

Figure 11 (page 24). The two communicators were the dyadic members. The design was structured so that communication was originated by the subordinate. The communicative stimuli was represented both by the posttest instruments and by the awareness treatment exercise (experimental groups only). The potential for filtering information on the part of the subordinate was established through use of posttest instrument situations that could be perceived as damaging to the subordinates. The research hypotheses state that communication interference or filtering will be reduced by the introduction of awareness to the experimental dyad. The posttest instruments were developed to simulate an Air Force organization and external environmental effects to the testing were minimized. The organizational framework of the paradigm was represented by the interpersonal relationships within the dyad.

Fifteen randomly selected dyads (experimental group) were exposed to a treatment (X) and a posttest situation (O_1) while thirty randomly selected dyads (control

group) were posttested only. This procedure modeled a working relationship between a newly paired subordinate and supervisor, and permitted the testing of the first hypothesis. Following the posttest, a five minute feedback session (F_1) was permitted for both groups to allow the designated supervisor to ask the designated subordinate questions concerning the posttest situation (O_1). This working relationship provided the requisite prior condition (preestablished working relationship) for testing the second hypothesis.

Next, the dyads of the control group were randomly assigned to two subgroups of equal size for subsequent testing. One subgroup (experimental group) was exposed to the treatment (X) and posttested with an instrument (O_2) of similar design to the first posttest (O_1). The remaining subgroup (control group) was not exposed to the treatment (X) but was posttested with the same instrument (O_2). The specific procedures for data collection are contained in Appendix E, and details of the experimental setting are contained in Appendix F.

The original control group was subdivided and posttested a second time for two reasons. First, this portion of the experiment created the "established working situation" necessary to test the second research hypothesis.

Secondly, this procedure allowed the researchers to obtain additional data from a limited sample.[2]

The reader should recognize that a potential posttest sensitization may have existed in the second experiment since consecutive posttests were given. The potential sensitization was minimized by structuring the second posttest situation in a similar manner to the first, but utilizing a different setting. In addition, to avoid maturation and historical effects, treatments and posttests were administered on the same day (3:5).

Population and Sampling

The population consisted of all male and female officers in the United States Air Force (USAF), who met the researchers' definition of middle managers. Middle managers were defined as those officers in the grades of lieutenant, captain, and major who had from one to seventeen years of service.

The sample was drawn from the USAF officers attending the School of Systems and Logistics graduate degree programs (LSG) at the Air Force Institute of Technology (AFIT) located at Wright-Patterson Air Force Base, Ohio. Attendance at AFIT is highly competitive. The selection

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[2]The potential sample size was 179 members. Of that number 95 were volunteers, and 90 actually participated in the research. The 90 participants were paired into 45 dyads.

process itself is based on one's past performance, promotion potential, and academic grades in undergraduate studies (35:4-6). Therefore, these officers, by virtue of their selection to attend AFIT, were judged to have promotion potential and were considered a valuable asset to the USAF.

Due to the nonrandomized selection of the officers to attend AFIT, there exists a possibility that the sample was biased with respect to some personal characteristics and abilities. Although some differences may have existed between the sample AFIT students and the remaining Air Force population of middle managers, this bias was assumed to be unimportant for the following reasons:

1. There were AFIT qualified officers who declined attendance.

2. Attendance at AFIT was limited, and not everyone who was qualified could attend.

3. Some officers preferred to obtain graduate degrees during non-duty hours at their local bases.

4. Graduates of LSG programs were members of the Air Force middle management population.

Thus, the Air Force population of middle managers was assumed to have many AFIT qualified officers. Also, it is recognized that participation within the experiment required no special ability or talent which would lend itself only to those attending AFIT. Consequently, any

difference between subpopulations of AFIT selected officers and non-AFIT selected officers was assumed to be minimal and to not significantly affect the ability to generalize the research results. The researchers concluded that the sample was representative of the Air Force middle management population.

The officers participating in the experiment were randomly selected. First, a roster of USAF lieutenants, captains, and majors currently attending AFIT/LSG and meeting the service time criterion was obtained, and each qualifying officer was assigned a single, unique number. The total number of eligible participants was 179 officers comprising three classes (77A, 77B, and 78A) of approximately 60 officers each. Secondly, the Texas Instrument's calculator SR 51A was used to generate random numbers without replacement. Subjects whose assigned numbers matched the random numbers were selected for the experiment.

Because participation in the experiment was voluntary, it was expected that some individuals would be unable to participate or would not choose to participate. Therefore, random numbers were drawn using the described selection process until 90 randomly selected individuals had agreed to participate.

The 90 individuals were assigned to 45 dyads by the researchers in a manner that reduced the possibility

that any individual was aware of his partner.[3] After the dyads were formed, each was randomly assigned an exclusive number from one to 45. The dyads were then assigned to the experimental and control groups in a one to two proportion so that there were 15 experimental and 30 control dyads. Next, the 30 control dyads were subdivided into equal sized experimental and control groups for the second experiment.

Given the sample selection process, guarded generalizations can be made from the sample to the population. As stated previously, there may have been a slight difference between the sample and the population, but this difference was assumed to be minimal with no effect on the experiment. To the extent that USAF middle managers are considered to be similar to business and industrial middle managers, the reader may wish to generalize the results to middle managers within such organizations.

Dependent and Independent Variables

The dependent variable was the amount of unfavorable information that was communicated from a subordinate

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[3]Unawareness criteria consisted of: no members of car pools were paired, members of the same section were not paired, and individuals assigned to the same base immediately prior to AFIT attendance were not paired.

to a supervisor during a dyadic communication situation.[4] Two upward communication instruments (posttests O_1 and O_2) were developed to reflect an Air Force organizational situation and were used to measure the dependent variable.

The independent variable was awareness of self and another individual. This variable was allowed to take on two values: aware (experimental group) and not aware (control group). The treatment consisted of a structured disclosure exercise, Dyadic Encounter: A Program for Developing Relationships (24:93) (see Appendix A).

Treatment

The self-disclosure exercise, Dyadic Encounter, was used as the treatment for the experimental groups. This exercise was a modified, structured exercise from Pfeiffer and Jones' A Handbook of: Structured Experiences for Human Relations Training (24:90). The existing instrument was modified for two reasons. The original encounter session was estimated to take two hours to complete (24:90). This amount of time was judged to be excessive because of sample availability limitations imposed by their schedule. In

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[4]Amount of unfavorable information was defined to be the number of unfavorable items transmitted in a communications encounter and was measured by posttest instruments (O_1 and O_2). The posttest instruments were also designed such that other categories of information, such as not unfavorable and important, could be measured.

addition, the introduction of Air Force related problems was deemed advantageous to both the experimental setting (conducted with Air Force officers) and the application of the research (to Air Force organizations).

The exercise goal was ". . . to explore knowing and trusting another person through mutual self-disclosure and risk-taking [24:91]." Through self-disclosure, individuals within a dyad were encouraged to reveal their feelings, attitudes, and perceptions to their partner in a similar manner to that described by the Johari Window (34:304). This reaction is referred to as the "dyadic effect" (34:309). A self-disclosure exercise will increase an individual's knowledge of his partner and himself and promote an improved interpersonal relationship that is a significant element of interpersonal communication (34:295).

The exercise consisted of twenty-five questions that requested each member of a dyad to discuss personal information with his partner. Approximately 45 minutes were needed for the exercise. Since personal information was requested, the dyadic members were instructed that they were free to decline to answer a question or stop the exercise if either member became uncomfortable or anxious.

Posttest

The instruments used in measuring the amount of upward communication were designed specifically for this

research. The instruments were structured to permit measurement of an upward, dyadic information flow in a U.S. Air Force organization at the middle management level. The instruments consisted of a supervisor's orientation (Part A), subordinate's instructions (Part B), a case study (Part C), and the output device (Part D). It was necessary for the objective evaluation of the instruments for each individual in the experimental dyad to perceive the role that they were assigned and react accordingly (4:192). The role assignments were by random selection. After introduction to the role and case study, the subordinate was then free to pick those items of information in Part D that he chose to forward to his supervisor as output. The subordinate was instructed that he could choose to forward none of the information, all of the information, or any portion thereof to his supervisor. The output instruments and implementing instructions are located in Appendices B and C.

Posttest Classification

A posttest instrument classification survey was conducted to obtain the data required to classify the output measure by favor and importance.[5] A total of thirty

[5]Although the hypotheses of this research address the amount of unfavorable information communicated to the *supervisor*, the *importance* of that unfavorable information communicated was also useful for analysis.

LS student volunteers possessing characteristics similar to those of the sample classified the items of information located in Part D of Appendices B and C. The classification scheme was based on the individual, independent respondent's perception of the favor and importance of an item of information relative to a problem setting (Posttest Instrument 1: Appendix B, Part C and Posttest Instrument 2: Appendix C, Part C). Table 1 shows a two by two classification matrix which was used to instruct the respondents in categorizing the items of information. In addition, the operational definitions of favor and importance were described in the instructions to the respondents of the classification survey (Appendix D).

Table 1

Information Classification Matrix

Favor to Subordinate	Importance to Supervisor	
	Important	Not Important
Not Unfavorable		
Unfavorable		

After the collection of the respondent's data, the classification ratings were grouped by frequency into the following four classes:

1) Not unfavorable/important.

2) Not unfavorable/not important.

3) Unfavorable/important.

4) Unfavorable/not important.

The frequency of responses for the classification of information rated as not unfavorable, unfavorable, not important, important, and unfavorable-important was tested for statistical significance using the Binomial Test. The Binomial Test is a test of difference to determine if it is "reasonable to believe that this sample is a random sample from some known population [30:35]." This test is appropriate because the two nominal ratings of not unfavorable and unfavorable make up the entire sample space of the characteristic of favor, and the distribution is approximated by the binomial distribution. The same argument is also true for the case of importance. The Binomial Test can be reduced to a hypothesis test based on the a priori assumption that either condition of favor (or either condition of importance) is just as likely to be chosen as the other. Thus, the null and alternative hypotheses were:

H_o: $p(1) \leq p(2)$

H_1: $p(1) > p(2)$

where p(i) = probability of a condition of favor or importance

Because p(1) + p(2) are equal to the entire sample space, and they are equal under the null hypothesis, they must

both have a probability of occurrence of .5. Since the alternative hypothesis was stated in terms of an a priori, "greater than" belief, the test was reduced to one tail of the distribution curve.

For the purpose of this application of the Binomial Test, an α value of .10 was chosen as the critical level of significance. Thus, if the computed probability was less than .10, then the researchers were at least 90 percent confident of the decision to reject H_o and conclude that p(1) was greater than p(2). The computed probability was calculated using the following formula:

$$p(X) = \binom{N}{X} P^X Q^{N-X}$$

where p(X) = probability of X

N = total number of cases

P = Q = .5

X = frequency of X

Using this formula, it was determined that for thirty responses, a minimum of nineteen were required in any one category for a 90 percent confidence level in classifying that response accordingly.

It is important to note that the items of information open to the "subordinate" to pass to his "supervisor" in the experiment represented all of the "subordinate's" possible choices. Since all of the items were categorized

according to the information classification matrix, and a zero level was established, ratio level data was obtained. The results of the classification survey are contained in Chapter IV.

Statistical Hypotheses

The following two hypotheses were tested:

1. Within a newly established relationship, subordinates who are aware of self and their supervisors communicate more information to their supervisors that is potentially unfavorable to themselves.

2. Within an existing relationship, subordinates who become aware of self and their supervisors communicate more information to their supervisors that is potentially unfavorable to themselves.

Statistical Analysis

In the test of hypotheses, the arithmetic means of the control and experimental groups were compared to determine if the means were from the same population or from populations with identical values (5:331). The null and alternate hypotheses were:

H_0: $\mu_E \leq \mu_C$

H_1: $\mu_E > \mu_C$

where μ_E = mean of the experimental groups

μ_C = mean of the control groups

The null hypothesis stated that the mean of the experimental group was less than or equal to the mean of the control group while the alternate hypothesis stated that the mean of the experimental group was greater than that of the control group.

Levels of Statistical Significance

In hypothesis testing, levels of significance were established to control error that occurs when a researcher rejects a true hypothesis. This type of error is referred to as Type I error or alpha error (α) (18:553). A significance level of .05 meant that an obtained result could occur by chance only five times in a hundred trials (17:169). The lower the value of α , the greater the significance of difference would be, and the probability of making a Type I error would be reduced.

"The level of statistical significance is to some extent chosen arbitrarily, but it is not completely arbitrary [17:169]." Each researcher predetermines the type of error and the level of risk he or she is willing to accept. In this research, the level of significance was established at $\alpha = .20$, $\alpha = .10$, and $\alpha = .05$. Although "experimenters in the behavioral sciences frequently set the Type I error rate at .10 or .05 [18:31]," this is a convention, and it is considered neither too high nor too low for most social science research (18:32; 17:170). In

addition, a Type I error of α = .20 was established for several reasons. The first was the small size of the first experimental group (15 dyads). Second was the expected inability of the posttest situations to generate the same amount of pressure upon the subordinate to cause deliberate filtering of upward communication that would exist in a real situation. Third, it was felt that the penalty attached to saying there was no difference when one really existed (Type II error) was greater than that attached to saying there was a difference when one did not actually exist (Type I error).

Rejection of the null hypothesis at α = .20 was labeled "marginally significant" and is indicated with an asterisk (*). Rejection of the null hypothesis at α = .10 was labeled "moderately significant" and is indicated by two asterisks (**). Finally, rejection of the null hypothesis at α = .05 was labeled "significant" and is indicated with three asterisks (***).

Statistical Test

The oneway ANOVA (equal and unequal sample sizes) was used to determine if the difference between the experimental and control groups was significant. The ANOVA was chosen because it ". . . is one of the most powerful statistical methods [5:456]." Briefly, the ANOVA statistical technique is a ratio of the variances between groups and

within groups. The test statistic is the F-Probability, a one-tailed test to the right with the null hypothesis being rejected if the test value is greater than the critical value.

The test of significance with the oneway ANOVA is based on the following basic assumptions (5:458):

1. Each sample is drawn randomly and independently from a different class or treatment population.

2. The variances of the class or treatment population are all equal.

3. The class or treatment population is normally distributed.

The statistical hypotheses used to represent the experimental and control groups were divided into the following two separate tests as required by the research design:

(1) $H_o: \mu_{E1} \leq \mu_{C1}$ where μ_{E1} = mean of experimental group 1
$H_1: \mu_{E1} > \mu_{C1}$ μ_{C1} = mean of control group 1

(2) $H_o: \mu_{E2} \leq \mu_{C2}$ μ_{E2} = mean of experimental group 2
$H_1: \mu_{E2} > \mu_{C2}$ μ_{C2} = mean of control group 2

In these tests, the effect classes were the experimental and control groups of dyads while the observations were scored values of the amount of unfavorable information

transmitted upward by each dyad in the experimental and control groups.

The oneway ANOVA with equal and unequal sample sizes was calculated using a computer subprogram (Oneway).[6] This subprogram was employed due to the numerous options and statistics available to the user (21:422).

Test for Normality

The originally desired number of experimental dyads to be tested was not obtained due to the lack of volunteers and the limited time frame in which the experiments were conducted. A sample size of 30 dyads each for the experimental and control groups was the initial goal, but the design had to be modified, because of the lack of volunteers, to the testing of 15 dyads for the experiment group and 30 dyads for the control group. The requirement for 30 control dyads was essential because this group was subsequently divided into secondary experimental and control subgroups. In order to make any valid comparisons between these secondary subgroups, the researchers felt that at least 15 dyads should be included in each subgroup. It is recognized that the testing of the 15 dyads in the initial experimental group fell well short of the 30 dyads required

[6] Oneway is a subprogram of the SPSS (Statistical Package for the Social Sciences) ANOVA program.

to comply with the central limit theorem.[7] However, the establishment of the sample size of 30 is an arbitrary judgment (32:122). In fact, the sample size necessary to approximate the underlying distribution of the population is dependent on the shape of the distribution (32:122). For example, if the population is normally distributed, then a sample size of 12 may be adequate to determine the population's parameters, while the population of a U-shaped distribution would require a minimum sample size of 30 in order to determine the population's parameters (32:123).

Two techniques were used to detect normality in the first experimental group for the purpose of justifying the third assumption (normality) of the ANOVA statistical test and strengthening potential inferences to be made from the sample to the population. The first and simplest technique to identify the sample's distribution was to graphically plot the frequency of occurrence (number of dyads) versus the number of items of information transmitted to the supervisor and observe if the resulting curve fit a normal distribution. The second technique used was the Kolmogorov-Smirnov (K-S) Test. The purpose of a K-S Test is to test

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[7] The central limit theorem states that large samples (thirty or more) are approximated by the normal distribution if a finite mean and standard deviation can be identified (5:240).

a sample to determine if it could have been obtained from a particular population distribution (30:47). The null hypothesis of the K-S Test assumes that a sample distribution is normally distributed while the alternate hypothesis states that the distribution is not normally distributed. There are three specific characteristics of the test, the first of which is that there is no limitation on sample size. Secondly, the distribution must be continuous. Although discrete data may be substituted, the test becomes more conservative, and the level of confidence cannot be exactly determined. However, it will be at least the prespecified level. The third characteristic is that the parameters (μ, σ^2) of the distribution must be known or estimated, and the sample cannot be used to estimate these parameters. When the parameters are estimated, the Lilliefor tables will be utilized to determine the critical difference value. The test statistic is the comparison of the critical difference, based on a specified alpha level and the sample size, and the maximum difference calculated from the sample. Based on these differences, the null hypothesis cannot be rejected if the maximum calculated difference is less than the critical difference. The sample is then assumed to be normally distributed. If the maximum calculated difference is greater than the critical difference, then the null hypothesis is rejected, and the sample is assumed not to be normally distributed.

Criteria Test

The research hypotheses and the statistical hypotheses were the same; therefore, if statistically significant differences existed between the means of the experimental groups and the control groups, then the research hypotheses were supported. Support for the second hypothesis would reinforce the first hypothesis and indicate that awareness of self and others would improve upward communication within existing subordinate-supervisor dyads. On the other hand, failure to support the first hypothesis while the second hypothesis was supported would suggest that only previously established subordinate-supervisor dyads were subject to improved upward communication through awareness of self and others.

CHAPTER IV

RESULTS

Classification Survey

A major portion of the research effort involved the classification of the posttest instruments (0_1 and 0_2) according to favor and importance. The results of this classification survey are presented in Appendix G. Five classification categories were obtained: not unfavorable, unfavorable, important, not important, and unfavorable-important.[1] An individual item of information was classified as belonging to any of the aforementioned groups by means of the Binomial Test as described in Chapter III. Table 2 reemphasizes the classification matrix and displays the definitions and abbreviations used in the remainder of the text.

Findings of the Normality Test

The plot of the frequency of occurrence versus the number of items of information transmitted for the 15

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[1]The last category, unfavorable-important, was included as an area of analysis because it represented a subset of unfavorableness. For an item of information to be unfavorable, the surveyed responses for blocks B-1 and B-2 (see Table 2) were combined to meet the Binomial Test criteria for a 90 percent confidence in classifying the item accordingly. Unfavorable-important required that at least 19 of 30 responses be in block B-1 only.

Table 2

Communication Classification Codes

Favor to Subordinate	Importance to Supervisor	
	Important	Not Important
Not Unfavorable	A-1	A-2
Unfavorable	B-1	B-2

Not Unfavorable: (NUNF) — will not reflect unfavorably on the subordinate

Unfavorable: (UNF) — will detract from the supervisor's perception of the subordinate

Important: (IMP) — relevant information to the case and beneficial to the knowledge of the supervisor

Not Important: (NIMP) — irrelevant information that does not inform the supervisor

Total Passed: — total items of information passed to the supervisor by the subordinate

Total Possible: (TOTAL POSS) — the number of items of information available to be passed

Unfavorable--Important: (UNFIMP) — an individual item of information is rated according to the above definitions in block B-1 by at least 19 of 30 respondents

experimental dyads approximated a normal distribution. In addition, the Kolmogorov-Smirnov Test for a single sample of ungrouped data conducted with the 15 experimental dyads indicated that the sample was normally distributed at a confidence level of 99 percent. Appendix I contains the graph and the K-S Test calculations.

Data

Tables 3, 4, 5, and 6 display the data obtained from the experimental tests. Each table displays the responses for 15 dyads as well as the group total except for the first control group (Table 4) which shows data for the thirty participating dyads. Six categories of information were obtained from each experiment. In addition to the five categories mentioned in the previous section, the total number of items of information transmitted by each dyad was recorded for analysis.[2] The total items passed were useful in obtaining the ratios of information passed. These ratios, shown in Table 7, were designated by groups and posttest instruments according to the following:

E 1 - experimental group
C 1 - control group
> Posttest Instrument 1

[2]This information is referred to as Total Passed in Tables 3, 4, 5, and 6. It is not the summation of the individual row values, but rather the sum of the items passed.

Table 3

Items of Information Communicated by Experimental Dyads Using Instrument 1(0_1)

Dyad	UNF(B)	NUNF(A)	IMP(1)	NIMP(2)	UNFIMP (B1)	TOTAL PASSED
1	4	6	13	0	3	19
4	4	10	14	0	3	22
7	5	9	17	0	4	22
10	5	7	12	0	4	17
13	3	9	9	0	3	16
16	4	2	9	0	3	10
19	10	10	22	0	6	30
22	5	5	16	0	2	20
25	10	10	21	0	6	30
28	6	8	15	0	4	22
31	5	8	17	0	3	22
34	3	7	8	0	2	14
37	7	7	14	0	5	18
40	4	7	11	0	2	14
43	6	3	13	0	4	15
Column Totals	81	108	211	0	54	291

Table 4

Items of Information Communicated by Control Dyads Using Instrument $1(0_1)$

Dyad	UNF(B)	NUNF(A)	IMP(1)	NIMP(2)	UNFIMP (B1)	TOTAL PASSED
2	4	12	13	0	3	23
3	5	6	14	0	2	18
5	4	2	6	0	3	7
6	6	3	11	0	4	14
8	6	5	13	0	4	16
9	9	7	18	0	5	26
11	4	3	8	0	4	12
12	4	12	13	0	1	23
14	6	5	14	0	4	16
15	4	7	11	0	4	14
17	8	12	18	0	4	27
18	7	12	20	0	3	27
20	7	6	16	0	4	21
21	7	7	15	0	4	22
23	8	13	19	0	5	27
24	7	7	17	0	5	23
26	7	10	16	0	4	24
27	5	6	10	0	3	12
28	6	13	16	0	4	24
30	6	6	19	0	4	20
32	7	13	18	0	4	26
33	6	5	7	0	5	19
35	4	5	11	0	2	15
36	2	11	13	0	1	20
38	4	14	17	0	2	25
39	1	9	8	0	0	12
41	4	10	14	0	3	21
42	7	9	17	0	4	23
44	8	4	15	0	5	20
45	5	10	17	0	3	22
Column Totals	168	244	424	0	103	599

Table 5

Items of Information Communicated by Experimental Dyads Using Instrument $2(O_2)$

Dyad	UNF(B)	NUNF(A)	IMP(1)	NIMP(2)	UNFIMP (B1)	TOTAL PASSED
3	7	23	26	2	5	31
6	7	18	21	3	5	28
9	6	16	23	0	5	25
12	8	27	28	4	6	38
15	6	14	22	0	6	22
18	5	6	11	0	3	11
21	7	21	24	3	5	30
24	5	15	20	0	4	21
27	6	23	22	2	4	26
30	7	16	21	3	6	25
33	5	11	18	0	5	18
37	4	20	18	5	2	24
39	7	26	27	3	5	35
42	6	11	16	1	4	17
45	7	20	25	2	5	30
Column Totals	93	267	322	28	70	381

Table 6

Items of Information Communicated by Control Dyads Using Instrument $2(O_2)$

Dyad	UNF(B)	NUNF(A)	IMP(1)	NIMP(2)	UNFIMP (B1)	TOTAL PASSED
2	4	5	7	1	4	10
5	6	16	19	3	5	25
8	5	17	23	0	5	24
11	7	3	12	0	5	12
14	8	27	28	5	6	38
17	4	12	18	0	4	18
20	7	14	22	0	5	23
23	8	14	19	4	6	25
26	8	14	21	2	6	24
29	5	27	21	2	5	31
32	2	1	4	0	2	4
35	4	13	16	2	3	19
38	1	13	12	1	0	15
41	8	15	23	2	6	25
44	6	16	19	3	5	24
Column Totals	83	207	264	25	67	317

Table 7

Percentage of Information Communicated by Groups

	Ratio	Group E1	Group C1	Group E2	Group C2
1	$\frac{\text{TOTAL PASSED}}{\text{TOTAL POSS}}$	.55	.57	.65	.54
2	$\frac{\text{UNF}}{\text{TOTAL PASSED}}$	.28	.28	.24	.26
3	$\frac{\text{NUNF}}{\text{TOTAL PASSED}}$	.37	.41	.70	.65
4	$\frac{\text{IMP}}{\text{TOTAL PASSED}}$	.73	.71	.85	.83
5	$\frac{\text{NIMP}}{\text{TOTAL PASSED}}$	-	-	.07	.08
6	$\frac{\text{UNFIMP}}{\text{TOTAL PASSED}}$	.19	.17	.21	.18
7	$\frac{\text{UNFIMP}}{\text{UNF}}$	.67	.61	.75	.81
8	$\frac{\text{IMP}}{\text{IMP TOTAL}}$	.59	.59	.77	.63
9	$\frac{\text{UNF}}{\text{UNF TOTAL}}$	.54	.56	.78	.69
10	$\frac{\text{NUNF}}{\text{NUNF TOTAL}}$	.48	.54	.64	.49
11	$\frac{\text{UNFIMP}}{\text{UNFIMP TOTAL}}$	.60	.57	.78	.74

Note: The denominators of Ratios 8, 9, 10, and 11 represent the total number of possible responses in each given category.

E 2 - experimental group
C 2 - control group
> Posttest Instrument 2

Because of the differences in the setting between the two testing situations (0_1 and 0_2), specifically different posttest instruments and the increased opportunity for subordinate-supervisor interaction in the second situation, no statistical tests were made to cross-analyze the results of the two experiments. However, general inferences as to the differences in the test results are readily observed in Table 7, and some are mentioned in this text.

Eleven different ANOVA comparisons were performed on the differences between respective experimental and control groups. The F-Ratio and F-Probability of these comparisons are found in Table 8. Table 9 displays the means and standard deviations of individual groups for each comparison. The remainder of the sum of squares tables for each Oneway ANOVA comparison may be found in Appendix H.

Analysis

From the data obtained in this experiment, several differences are apparent. The first difference to be noted is that of total information passed by a subordinate to his supervisor. In Table 7, Ratio 1 (total items passed/total items possible), a marked difference between group E 2 and the other groups is noted. The difference is further highlighted by the ANOVA results presented in Table 8,

Table 8

Statistical Comparisons by Oneway ANOVA Between Experimental and Control Groups

Comparison of Information Classified as:	15 Experimental Dyads against 30 Control Dyads Posttest Instrument 1(0_1)		15 Experimental Dyads against 15 Control Dyads Posttest Instrument 2(0_2)	
	F-Ratio	F-Probability	F-Ratio	F-Probability
1 NUNF	0.855	0.363	2.757	0.104*
2 IMP	0.003	0.911	3.654	0.063**
3 TOTAL PASSED	0.110	0.738	2.120	0.153*
4 NIMP	-	-	0.115	0.734
5 UNFIMP	0.168	0.685	0.147	0.704
6 UNF	0.104	0.744	1.084	0.308
7 $\frac{\text{UNF}}{\text{TOTAL PASSED}}$	0.147	0.703	0.911	0.350
8 $\frac{\text{UNFIMP}}{\text{UNF}}$	1.410	0.240	0.300	0.595
9 $\frac{\text{NUNF}}{\text{TOTAL PASSED}}$	0.567	0.462	1.978	0.167*
10 $\frac{\text{IMP}}{\text{TOTAL PASSED}}$	0.134	0.715	0.108	0.741
11 $\frac{\text{TOTAL PASSED}}{\text{TOTAL POSS.}}$	0.094	0.754	2.251	0.141*

*Significant at $\alpha = .20$
**Significant at $\alpha = .10$

Table 9

Comparisons of Descriptive Statistics

Comparison of Information Classified as:	O_1				O_2			
	E1		C1		E2		C2	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
NUNF	7.20	2.43	8.13	3.50	17.80	5.89	13.80	7.23
IMP	14.07	4.11	14.13	3.79	21.47	4.49	17.60	6.42
TOTAL PASSED	19.40	5.59	19.97	5.31	25.20	6.71	21.13	8.48
NIMP	-	-	-	-	1.87	1.67	1.64	1.59
UNFIMP	3.60	1.30	3.43	1.28	4.67	1.11	4.47	1.68
UNF	5.40	2.16	5.60	1.85	6.20	1.08	5.53	2.23
$\frac{\text{UNF}}{\text{TOTAL PASSED}}$	28.00	7.56	29.13	10.09	25.13	7.20	28.80	13.02
$\frac{\text{UNFIMP}}{\text{UNF}}$	67.13	15.77	60.30	19.26	74.87	13.41	78.87	24.91
$\frac{\text{NUNF}}{\text{TOTAL PASSED}}$	37.13	10.62	40.03	12.86	67.93	9.51	60.60	17.82
$\frac{\text{IMP}}{\text{TOTAL PASSED}}$	73.00	9.70	71.80	10.68	86.53	9.58	85.27	11.44
$\frac{\text{TOTAL PASSED}}{\text{TOTAL POSS.}}$	55.53	15.99	57.03	15.19	65.13	18.07	54.20	21.69

Comparisons 3 and 11. In both cases, no significant difference exists between the experimental and control groups for the first testing (O_1), but in the second testing (O_2), a marginally significant difference at $\alpha = .20$ was present (with respective confidence levels of 84.7 percent and 85.9 percent in the difference between means[3]). The statistics indicate that in testing O_2, the experimental group transmitted more items of information than did the control group.

The second distinguishable difference in the data is suggested by Ratios 4 and 8 of Table 7. Ratio 4 (important items passed/total items passed) is of near equality between each experimental group and their respective controls. The difference between the two testings may be explained by the inherent differences between the posttest instruments in that instrument O_2 contains a greater percentage of important information than does O_1.[4] Ratio 8 (important items passed/important items possible) is notable because of the relatively high proportion exhibited by group E 2. It would appear that group E 2 passed more of the important information which was available than did the control group. In Table 8, this contrast is supported

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[3]Confidence level is 1-(F-Probability).

[4]Important items of information/total items of information: O_1 - 69%; O_2 - 72%.

by comparison 2. While no difference of importance was evident between the groups in the first testing situation (O_1), the second testing (O_2) showed a moderately significant difference (93.7 percent confidence) in favor of the experimental group. Comparison 10 (Table 8) indicates that as a proportion of total information passed, subordinates tended to send the same percentage of important information to their superiors. An explanation, reflected in Ratio 1 of Table 7, is that while in the second testing, subordinates sent forward significantly more important information, they also sent forward more total information.

The next notable difference concerns not unfavorable information, or information deemed as neutral or favorable to the subordinate's cause. Ratios 3 and 10 (Table 7) indicate that in the second testing situation, the experimental group forwarded more not unfavorable information than did the control group. Comparisons 1 and 9 of Table 8 support this conclusion. The relatively low confidence levels of the first testing are in noted contrast to the 89.6 percent and 83.3 percent levels of confidence in the second testing situation that a marginally significant difference between means existed between the experimental and control groups. To this point, the researchers have noted that in the second testing situation, the experimental group passed more total information, more important

information, and more not unfavorable information than did the control group.

The research hypothesis dealt specifically with the amount of unfavorable information that a subordinate would communicate to his supervisor. Two categories of the type of information were identified for analysis: information that was unfavorable-important, and information deemed to be unfavorable. The first category, unfavorable-important, can be analyzed using Ratios 6 and 11 (Table 7). These ratios indicate that the differences between the experimental and control groups in both tests were small. This conclusion is further supported by Comparison 5 of Table 8, a contrast of the means between both groups of the amount of unfavorable-important information transmitted, which shows the F-Ratios of the two tests to be nearly identical.

Within the broader limits of information termed unfavorable, Ratios 2 and 9 (Table 7) indicate little if any difference. The greatest difference is suggested by group E 2's higher proportion of unfavorable information passed to unfavorable information total (Ratio 9) than C 2 experienced. Comparison 6 of Table 8 adds statistical credence to this conclusion. The statistical test on O_1 data showed no reason to believe that there was a difference between control and experimental groups whereas O_2 showed tendencies toward a statistical difference between the two groups. However, the resulting confidence level of 69.2

percent is judged by the authors to be too low to draw any firm inference. Therefore, neither statistical hypothesis of a difference between the experimental (aware) and control (not aware) groups with respect to the amount of unfavorable information passed could be considered to have been supported.

A ratio of unfavorable-important versus unfavorable information passed is presented by Comparison 8 of Table 8. The F-Ratio for the first testing (0_1) indicates that the experimental group sent a greater proportion (76 percent confidence level) of unfavorable-important information to the total amount of unfavorable information to their supervisors than did the control group. Although the experimental group sent less unfavorable information than did the control group, a greater proportion of that information tended to be more damaging (unfavorable-important) than was the case with the control group.

The most consistent difference of the data is presented in Table 9. Of the 21 comparisons presented (10 of 0_1, 11 of 0_2), the standard deviation of the experimental group was less than that of the control group in 15 cases. Within the 0_1 experiment, the incidence of lowest standard deviation is evenly split between the experimental and control groups at five occurrences each. This implied equality is suspect on two accounts. First, the absolute value of the difference in respective standard deviations

between experimental and control groups is greater for those comparisons that indicate a lower standard deviation for the experimental group than the control. Secondly, the number of control group responses was double that of the experimental group. The larger sample size tends to reduce variability about the mean for the control group because the standard deviation is calculated with the sample size as the dividend. The result of a larger sample size is a reduction in standard deviation if other variables are held constant (5:246). More indicative of a difference in standard deviations is the case of O_2 where the standard deviations of the experimental group were lower than the control group's in ten of eleven cases. The research thus indicates that the standard deviations of the experimental group were noticeably lower in number of occurrences and value than those of the control group.

CHAPTER V

CONCLUSIONS

Test of Hypotheses

The first statistical hypothesis stated that subordinates of newly formed dyads who are aware of self and their supervisors communicate more information to their supervisors that is potentially unfavorable to themselves. The research failed to show any significant relationship between the awareness exercise and the amount of unfavorable information communicated by the subordinate to the supervisor. Based on statistical analysis of the data, the null hypothesis could not be rejected, and the researchers concluded that the introduction of the independent variable of awareness did not substantially reduce the MUM effect.

The second hypothesis was similarly structured as the first, but instead of examining newly formed dyads, the subjects were now members of a dyad characterized by an established working relationship. As in the first case, differences in the experimental data were too weak to reject the null hypothesis. However, the margin of failure was much narrower than in the first test. The difference between means of the experimental and control group was significant to the 69.2 percent confidence level. While

this level fell below the 80 percent necessary to reject the null hypothesis, the movement toward a difference between means is in the right direction and suggests a potential relationship between awareness and the communication of unfavorable information in an existing working relationship between a subordinate and supervisor.

Limitations

The experimental design of this research was constructed to measure the amount of unfavorable information that was communicated by a subordinate to his supervisor. Precautions were taken to control influences that would reduce the internal and external validity of the research. The posttest control group only design was utilized to control variables that could weaken the measurement. Four factors were recognized as having a potential influence on the results of the experiment. These factors are: (1) the number of subjects, (2) the time-limited awareness treatment, (3) possible posttest sensitization in the second testing situation, and (4) the artificiality of the experiment.

First, the originally desired number of experimental dyads to be tested was not obtained due to limited numbers of volunteers and the limited time frame in which the experiments were conducted. But the test for normality using graphing and the Kolmogorov-Smirnov Test revealed

that the first experimental group size of 15 dyads was sufficient to approximate a normal distribution. As a result, the authors have concluded that the small sample size did not distort the findings of this research.

It should be noted that the lack of volunteers to participate in the experiment was due to a time constraint on the population as well as the researchers. Of a total of 179 eligible participants in AFIT/LSG classes 77A, 77B, and 78A, 95 individuals volunteered their services. Class 77A had few volunteers (20) because they were enrolled in their final quarter and were completing the final requirements for their degree. Likewise, the students of 78A were in their first academic quarter and found the initial workload to be very stringent. Of this class, 27 individuals volunteered their services for the experiment. Class 77B had a 99 percent participation rate because of its more relaxed time schedule when the experiments were conducted. Also scheduling problems with the subjects in 77B were reduced from those of the other two classes because the researchers were from that same class.

A second limiting factor was the 45 minute time limit placed on the awareness treatment. The encounter exercise on which the treatment was based was designed to be two hours in length, but because of stringent limitations on the free time available to the subjects, the encounter was reduced to a 45 minute session. This enabled

the entire experiment to be conducted within the 75 minute time frame considered necessary to attract the volunteer subjects. The authors feel that the limitation of the awareness treatment to 45 minutes was the most serious shortcoming of this research design. Because awareness represents the independent variable and is the object of the exercise, the authors feel that the encounter exercise is important enough to warrant a longer treatment session in future testing.

Due to the small size of the sample available for testing, the original control group was subdivided into experimental and control groups for secondary testing. This design was necessary for the testing of the second hypothesis. Such a design lends itself to potential pretest sensitization since the secondary groups have already been tested with a similar instrument. Given a larger population and more relaxed experimental schedule, the authors suggest the following Four Groups Posttest Only with Control Group design.

30R	X_1	O_1	X_1 - pre-established relationship
30R	X_1 X_2	O_1	X_2 - awareness treatment
30R	X_2	O_1	O_1 - posttest
30R		O_1	R - randomly selected dyads

Figure 15. Four Groups Posttest Only with Control Group Design

Other advantages of this design will be discussed later in this chapter.

A fourth potential limiting factor was the simplified and artificial situation which was constructed to simulate an actual communication exchange between a subordinate and a supervisor. The participants were asked to role-play the position of a subordinate or a supervisor in a military organization. The subordinate was instructed to report the status of a potentially unfavorable situation. The pressure to filter unfavorable information by an individual role-playing the position of a subordinate may be reduced from the pressure of the actual situation. This relative lack of pressure may have induced the designated subordinates to communicate more information in the experiment than they would have if the situation was real.

Implications

The lack of statistical significance indicated that there was no strong relationship between awareness and the amount of unfavorable information communicated by a subordinate to his supervisor.

As a corollary to unfavorable information, the posttest instruments were designed to collect data on other categories of information, such as important, not unfavorable, and total information passed between the dyad. Unlike the case of unfavorable information, these three

categories did show significant differences, primarily in the second testing. While these three categories did not formally relate to the hypothesis test of reduction of the MUM effect, nevertheless, the authors feel that his data represents significant new information to the study of upward communication. The fact that subordinates of dyads with a pre-established working relationship tend to pass a greater amount of important, not unfavorable, and total information to their supervisors when they are aware than when they are not aware of self and supervisors is ample justification for future research in this field. Also, the indication of a larger difference between the experimental and control groups in the second testing than in the first in the amount of unfavorable information passed is indicative that the communication channel within the dyad was more open.

Equally important in the case of justifying further research is an examination of the presence of distortion by filtering of upward communication. The results of the experiments conducted in conjunction with this research indicate that subordinates withheld a substantial portion of both the unfavorable information (22-46 percent) and the important information (23-41 percent) available to them. The reader is also reminded that these posttest situations were simulations, and in no way generated the intense pressure to withhold unfavorable information as

would be the case in an actual situation. Clearly, the research does provide empirical evidence of deliberate filtering of upward communication. Because of the strong case presented in this research on the premise that the deliberate filtering of upward dyadic communication must be understood and methods sought to minimize its presence, the authors feel justified in recommending further research in this field.

The Four Groups Posttest Only with Control Group Design identified in Figure 15 is recommended for future research. Use of this design is predicated on correcting several potential problems in the research design of this experiment. At least 30 dyads for each of the four groups (240 individual participants) would alleviate any doubt that the samples were normally distributed by adhering to the conventional sample count necessary to claim normality (5:240). Obviously, such a design would require a larger sample population and more time to conduct the experiments.

The pre-established relationship of the recommended design (X_1) should be much stronger than the five minute feedback session of this research design. The authors suggest that a pre-established working relationship between a subordinate and supervisor with a longer period of interaction, such as six months, be used to test the second hypothesis of this research. Also, the authors feel that the increased amount of total information, important

information, and not unfavorable information transmitted in the second testing by the experimental group is sufficient to warrant further testing of the second hypothesis.

One of the conclusions of this research is that awareness must be further explored as a reducer of distortion of upward dyadic communication. In addition to the supporting arguments presented earlier in this chapter, the authors feel that the marked difference in standard deviations between the experimental and control groups discovered in the course of this research is significant. In both testing situations, evidence was presented which showed the standard deviations of the experimental group's statistics to be less than those of the control's. The importance of this difference is that this research points to a conclusion that a dependency exists between standard deviations and awareness. The authors point to this supporting evidence as further justification in the exploration of awareness as a modifier of upward dyadic communication. The case was made earlier in this chapter that the awareness treatment session of this experiment was too short. Therefore, the authors recommend a more expanded treatment session such as that recommended by Pfeiffer and Jones (24:90) in the pursuit of similar research.

By testing each group in the recommended design (Figure 15) with the same instrument, the advantage of cross comparisons between groups would enable a more

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extensive analysis than that which was possible in this experiment. Whereas in this research design, the comparison was between the experimental group and the control group in each separate testing, the Four Groups Posttest Only with Control Group Design would enable four simultaneous comparisons for any one parameter of analysis.

Concluding Remarks

It is hoped that the results of this research have increased the knowledge of the subject and called to the attention of communication oriented researchers the requirement for further test and analysis. Because the problem of reducing the filtering of unfavorable information in a subordinate-supervisor dyad is very complex and difficult to simulate in an experimental situation, the authors hope that the recommendation of the proposed research design will be helpful in structuring further efforts.

APPENDIX A

DYADIC ENCOUNTER EXERCISE

Read silently. Do not look ahead.

A theme frequently thought and occasionally voiced when persons are brought together for the first time is, "I'd like to get to know you, but I don't know how." This sentiment often is expressed in encounter groups and emerges in marriage and other dyadic relationships. Getting to know another person involves a learnable set of skills and attitudes, self-disclosure, self-awareness, nonpossessive caring, risk-taking, trust, acceptance, and feedback.

In an understanding, nonevaluative atmosphere, one confides significant data about himself to another who reciprocates. This "stretching" results in a greater feeling of trust, understanding, and acceptance, and the relationship becomes closer, allowing for more significant self-disclosure and greater risk-taking. As the two continue to share their experience authentically, they come to know and trust each other in ways that may enable them to be highly resourceful to each other.

This Dyadic Encounter experience is designed to facilitate getting to know another person on a fairly intimate level. The discussion items are open-ended statements which can be completed at whatever level of self-disclosure one wishes.

The following ground rules should govern this experience:

1. All of the data discussed should be kept strictly confidential.

2. Do not look ahead.

3. One partner should initiate the encounter on even-numbered questions while the other partner initiates on odd-numbered questions, so that the same individual is not always the initiator.

4. Each partner responds to each statement before continuing. Complete statements in the order they appear. Do not skip items.

5. You may decline to answer any question asked by your partner.

6. Stop the exercise if either partner becomes uncomfortable or anxious. Either partner can stop the exchange.

Look up. If your partner has finished reading, begin.

1. My name is . . .
2. My AFSC(s) and past jobs were . . .
3. My marital status is . . .
4. I have been stationed at the following bases . . .
5. The reason I'm here at AFIT is . . .
6. Right now I'm feeling . . .

7. When I enter a room full of people, I usually feel . . .

8. In groups I feel most comfortable when the leader . . .

9. I'm happiest when . . .

10. (Look your partner in the eyes while you respond to this item.) Right now I'm feeling . . .

11. A forceful leader makes me feel . . .

12. The thing that turns me off the most is . . .

13. When I'm alone, I usually . . .

14. In a group I usually get most involved when . . . (Listening Check: "What I hear you saying is . . .")

15. I'm rebellious when . . .

16. The emotion I find most difficult to control is . . .

17. My weakest point is . . .

18. I'm afraid of . . .

19. I'm most ashamed of . . .

20. Unions within the military are . . .

21. The OER rating system is . . .

22. Right now this experience is making me feel . . .

23. The thing I like best about you is . . .

24. What I think you need to know is . . .

25. On my next assignment I would like to go to . . .

APPENDIX B

POSTTEST INSTRUMENT 1

PART A: SUPERVISOR'S ORIENTATION

You are a Biomedical Services Officer (BSO) holding the rank of Lieutenant Colonel in the Air Force. You direct a research laboratory at a large USAF Medical Center. One aspect of your job concerns the supervision of several young BSO's who are recent graduates of medical school and are serving a three year internship in your research section. In most cases, your interns work on controlled experiments or assist you in the conduct of research requested by the Surgeon General. Captain Jones is an exception to this rule, however. Approximately half way through his tour as an intern, he submitted a research proposal to you. He suggested that a recently developed Health and Stamina Test (HST) could be used to pretest the physical capacity and emotional health of entrants to demanding, high-cost training schools and predetermine, by comparison of standards, the success or failure of each entrant. The result would be fewer "washouts" in the training programs with a substantial savings realized by the Air Force. Captain Jones proposed that he be allowed to conduct a feasibility study on the physical and emotional health predictability measure of the HST. The proposal was accepted by the Surgeon General and funded by the Air Staff for one year with an operating budget of $18,000.

The project has been underway for eight months. Your other duties have precluded you from involving yourself with Captain Jones' project. Because you will soon complete Captain Jones' annual performance report, you have asked him to give you a summary of his work on the HST project.

PART B: SUBORDINATE'S INSTRUCTIONS

A. General Instructions

This case study is a portion of our thesis effort. Your participation in our experiment is indispensible to our research, and we are grateful for your support. Please read each item of the specific instructions listed below and complete before moving to the next instruction.

B. Specific Instructions

1. Read the case written in Part A of your experimental booklet. As you are doing this, project yourself into the role described (by the pronoun "you") in the case.

2. Look at the experimental partner that you have been paired with. Project his role as that of the supervisor mentioned in the case.

3. In Part B of your experimental booklet, you will find 35 items of information listed that you may pass to your "supervisor" in answer to his request for a progress report. You may pass along all of these "items" of

information, none of them, or any portion thereof. In Part B of this booklet, select the number of those items of information (if any) that you elect to forward to your "supervisor." You may not substitute additional items of information of your own choosing. While some of these statements do not represent complete sentences, the basis of the statement will be used to complete the thought in either a verbal or written report. Feel assured that only those items of information that you circled will be passed on to your supervisor.

4. After you have selected your choices (if any), turn this booklet to your experimental monitor.

Thank you.

PART C: THE CASE

You are a Biomedical Services Officer assigned to the Research Division of a major U.S. Air Force medical center. Your section of five officers is on a three year "pre-residency" assignment following graduation from medical school. Your job for this assignment, as is the case with your contemporaries, is to conduct biomedical research with specific USAF applications.

Although your assignment is a training environment, you are being evaluated on an annual basis with your contemporaries under a similar quota system as presently affects

USAF line officers. You have been in this assignment for 22 months and are approaching the end of your second reporting period when another performance report will be written by your supervisor in which he evaluates your performance and promotion potential. Your boss is a selectee for promotion and rumor has it that he will soon be transferred as a result of his promotion. He will write your performance report between now and the next two months.

During the past year, you became interested in an area that is admittedly risky, but if it proved out, you felt your Air Force career would have got off to a good start. Approximately eight months ago while your contemporaries were proceeding with controlled, structured experiments, you proposed a research effort of your own choosing. Your proposal dealt with a new and untried "Health and Stamina Test" (HST) that had been designed recently. You contended that the HST could be modified and used as a model to test the mental and physical stamina of new inductees to high cost training programs. In so doing, you felt that the HST would predict those who would be unable to complete the rigorous training programs. The justification of your project would be a lower drop out rate for the training programs and a substantial cost reduction for the Air Force.

As a part of your proposal, you conducted a pilot study. Although your findings were somewhat weak by nature

of low correlation coefficients and questionable validity of sample inferences to the projected population, you were able to regather a more biased sample of data that supported your hypothesis. Your motive was not deceit but, rather, confidence in the HST and a desire to put it to a practical test. Your supervisor was pleased with your initiative and forwarded the proposal to the Surgeon General. With Air Staff concurrence, your project was approved for a test run of one year. The HST test project was funded to the order of $18,000, and although a staff was not appointed to you, you were given a fundable account with several data collection agencies to help you to collect the information necessary to complete the test run. You were also granted a computer account to aid in data sorting and analysis.

Now, eight months after the project's inception, you come to the realization that your project is in trouble. The project's operating budget is 80 percent exhausted whereas your plan called for a 55 percent expenditure by this time. The data that has been collected and analyzed thus far is spotty, inconclusive, and represents a poor randomization of the population. You believe that some of your collection agencies have been using the project's funding as a springboard to cover their own mismanagement, but because of inadequate accounting procedures specified in your plan, there is no way to trace your suspicions. Your

late realization of this problem can be attributed to the fact that you have been swamped with extra duties in addition to the HST. You had hoped that the "machinery" of the project would run smoothly on its own after initiation, but it appears to have run amuck instead.

You have four months remaining until the final report to iron out difficulties and salvage what remains. There is still time to "keep the ship from sinking," you feel. Unfortunately, your supervisor has asked you for a "how goes it" report. You have been free from his watchful eye up to now for any of several reasons, but you suspect that he needs some information on the progression of the HST for his own reports to higher levels in the chain of command and possibly as an input to your annual performance report.

PART D: ITEMS OF INFORMATION

1. As you may know, the final report on this project is due in four months, . . .
2. and I am confident that the HST project will yield very interesting results.
3. Of particular note is the strength of the data processed thus far on the physical aspect of the HST.
4. While the predictor does not offer a quantum jump over models currently in use, it does add validity to the HST.
5. I'm sure that further testing and modification will continue to bolster the Air Force's confidence in the HST.

6. There is a glitch or two that I've encountered which I feel you should know about.

7. I'm certain that they can be overcome in short order.

8. I really must devote more time to the HST . . .

9. so I'd like you to relieve me of my other duties in order to spend more time on the project.

10. Part of my problem concerns the budget.

11. The budget is approximately 80 percent exhausted . . .

12. where the planned schedule calls for a 55 percent figure at this point in time.

13. I wouldn't be unduly concerned except for the fact that I believe several of my appointed data collection agencies have been using the project's account unjustly, probably to cover their own financial difficulties.

14. Unfortunately, I have no firm proof of any illegal activity, . . .

15. and I doubt if it can be obtained.

16. My plan included rather inadequate accounting procedures for account users which includes the data collectors.

17. I can correct the procedure now, but it will not help me to retrieve any information on past activities.

18. The problems concerning the project's budget allotment can be corrected by good management techniques . . .

19. and relaxing a few constraints on the quality of my data.

20. This leads into my next problem area which concerns the results of the data that I have obtained thus far.

21. As I mentioned before, the HST is proving to be an excellent predictor of physical stamina, . . .

22. but in the realm of mental and emotional health, I'm receiving a poor efficiency rating between predictability of condition and past performance in jobs and schools requiring a high degree of mental and emotional health.

23. I'm certain that the Air Staff was primarily interested in this aspect of the project when the HST study was funded in September.

24. While the point can be made that I was guilty of "forcing" data into the model's proposal pilot study, . . .

25. I think the root of this problem goes back to my data collectors who I suspect of using the project's account improperly.

26. The data used in testing the mental and emotional status of study subjects must be of very high quality and is expensive to collect.

27. I believe that some of the data collectors have been slipping in "cheaper," less constrained data and charging the project's fund on a disproportionate basis.

28. This area of mental and emotional health predictability is the one part of the HST project that I'm unsure of.

29. The last problem concerns my sample data although I feel it can easily be corrected.

30. There are just too many gaps in the sample data that I have received.

31. Part of the strength of my project model is a proportionate sample from the population to which inferences can be made.

32. With the existing gaps in place, the inferences that I will make will be considerably weakened.

33. Overall, I feel that most of my problems with this project can be resolved before the completion of the final report.

34. The accounting procedures, budget problems, and sample representation can be corrected, I feel.

35. The mental and emotional health predictor portion of the HST is another story, and I am afraid that at best, the results of the project will be inconclusive.

APPENDIX C

POSTTEST INSTRUMENT 2

PART A: SUPERVISOR'S ORIENTATION

You are a USAF Lieutenant Colonel assigned to direct twelve small programs in a "basket" SPO (program office) in the Aeronautical Systems Division of AFSC. Captain Smith is the director of a program and is charged with the responsibility of managing the development and procurement of the ARC-126B UHF radio. The ARC-126B is a radio designed to replace the existing model in fighter aircraft. It will also be installed in new fighter aircraft as they are introduced into the tactical USAF inventory. The goals of the new design are to offer lower life cycle cost, improved flexibility, and a capability to resist jamming countermeasures.

Because of some difficulties in other SPO's within your command, you have been out of touch with the ARC-126B project over the past four months. Because the Air Force System Acquisition Review Council will be meeting in two months to consider the production decision for the new radio, you have asked Captain Smith to report on the progress of his program.

PART B: SUBORDINATE'S INSTRUCTIONS

A. General Instructions

This case study is a portion of our thesis effort. Your participation in our experiment is indispensable to our research, and we are grateful for your support. Please read each item of the specific instructions listed below and complete before moving to the next instruction.

B. Specific Instructions

1. Read the case written in Part A of your experimental booklet. As you are doing this, project yourself into the role described (by the pronoun "you") in the case.

2. Look at the experimental partner that you have been paired with. Project his role as that of the supervisor mentioned in the case.

3. In Part B of your experimental booklet, you will find 39 items of information listed that you may verbally pass to your "supervisor" in answer to his request for a progress report. You may pass along all of these "items" of information, none of them, or any portion thereof. In Part B of this booklet, select the number of those items of information (if any) that you elect to forward to your "supervisor." You may not substitute additional items of information of your own choosing. While some of these

statements do not represent complete sentences, the basis of the statement will be used to complete the thought in a verbal report. Feel assured that only those items of information that you selected will be passed on to your supervisor.

4. After you have selected your choices (if any), return this booklet to your experimental monitor.

PART C: THE CASE

You are a program manager assigned to direct a small "basket" SPO in the Aeronautical Systems Division, AFSC, that is detailed with the task of procuring a new UHF radio for existing and future Air Force fighter aircraft. Your project has progressed from the conceptual phase through the validation stage and a contract was awarded to one of the four competitors submitting designs and bids. The full scale development phase is well underway, and the Air Force System Acquisition Review Council is scheduled in the next two months to consider the production go-ahead decision. The radio that your program office is concerned with is being designed to offer a higher degree of reliability and maintainability, more tactical flexibility, and resistance to jamming countermeasures beyond existing UHF systems.

During the past three months, several problems have arisen which may endanger the future of your project. The first problem which came to your attention was one of engineering. The ARC-126B was specified to be equipped with a dual receiver and transmitter, capable of the simultaneous receipt and transmission on two separate frequencies. Recently discovered problems of overheating of the test unit may be traced to this requirement. The overheating of the radio decreases component lifetime and reduces the efficiency of the unit, thus reducing its reliability. The addition of a heat exchanger will require both design changes to the radio and structural changes to the aircraft. This added measure may return reliability to its previously specified level, but at the expense of added cost and reduced maintainability.

The requirement to resist communication jamming also appears to have led to problems. This capability was the primary motivating factor for the development of a new radio. Because this capability would require scientific innovation in an area where little had been accomplished previously, you felt compelled to leave those specifications associated with resistance to jamming open-ended. Although the ambiguity of these specifications had drawn some criticism from the Air Staff, you won your point by directing high-level attention to the urgent need for a solution of this critical shortcoming. Now,

it appears that you should have placed more faith in the concerns of your superiors. Your latest reports indicate that the production version of the experimental radio may cost as much as 40 percent more than the target of the original implementing instruction. You suspect that a great deal of this cost overrun is a result of the engineers "gold-plating" their design, adding costly components and features that are increasing performance by only the slimmest of margins.

Two other problems have surfaced recently which may affect the cost and timetable of the project. The first situation evolved from a constructive change. One of your deputies, a former maintenance officer, made an informal statement to you in the presence of the contractor's chief engineer that the ease of maintenance of the ARC-126B would be improved if a built-in, diagnostic test apparatus was included for the transmitter section of the radio. You readily agreed with his premise. Two days later, the contractor presented you with a cost proposal to definitize the change order to include the test apparatus at an additional cost of 12 percent per radio. When you told him that the self-test feature was not included in the original specifications, he countered with the agreement that your SPO had suggested the change. Together you negotiated a settlement to keep the proposed change as a potential post-production modification, and

the Air Force would reimburse the contractor for expenses associated with the design of the self-test feature under the current contract. The other complicating problem is an out-growth of the unscheduled design change. The contractor stopped all of his testing and corrective changes on the ARC-126B to concentrate on the design change. Now that the contractor is back to work on the original design, you discover that the timetable is behind by four to seven days. The overtime required to get back on schedule will add significantly to the project's cost.

In an effort to put the lid on future cost increases, you propose to develop a contract amendment to further specify the vague engineering limitations dealing with the jamming resistance unit. You feel certain that this change can be developed and implemented before the system review council meets. In the meantime, your supervisor has asked you for a preliminary report on the progress of the ARC-126B UHF radio procurement program. Thus far you have not kept your supervisor abreast of the problems you've encountered, partly because you felt that they would be self-correcting and also because your supervisor's time was being spent resolving problems with two other basket SPO's in his division.

PART D: ITEMS OF INFORMATION

1. We are definitely on the right track with the ARC-126B.
2. There are still a few problems to resolve,
3. but the radio should provide our tactical forces with a quantum jump in communicative ability.
4. In the design of future aircraft where the location of the radio can be fixed in the design stage, the ARC-126B should be a gem to maintain and service.
5. The one engineering problem that we have encountered thus far is an overheating symptom.
6. Its origin can be traced to the requirement for simultaneous dual frequency capability.
7. Evidently, the feature is overstressing our power sources over an extended period of operation.
8. The results of this problem are decreased component life and attenuated receiving capacity,
9. and they are serious enough to warrant corrective modification.
10. The solutions that the engineers have developed thus far are expensive.
11. They suggest the design of an oil or heat exchanger which will necessitate structural changes to the aircraft.
12. This will result in greater maintenance costs when one considers the additional difficulty concerned with removing and replacing the unit.
13. Despite the seriousness of the problem, I'm certain that we'll have an adequate solution soon.
14. I've given this design problem top priority.
15. The capability of the ARC-126B to resist jamming is excellent.
16. The engineers have gone all out to develop a system that is difficult to detect and ascertain which frequency the radio is operating on.

17. If jamming is detected, the radio will shift frequencies in a preset pattern so that monitoring radios can follow the shift, but the enemy will be forced to search and locate the frequency before jamming is recommended.

18. This feature was a costly one to develop,

19. and I fear that we may overshoot our initial costs estimates for the production model.

20. The overrun may be as high as 40 percent,

21. however, it is still too early to tell exactly how much it will be.

22. There are several contractual problems which I am correcting now.

23. One is in the area of specifications of the jamming resistance unit.

24. I feel that we've perfected the state of the art to the point that any more additions will not prove to be cost effective.

25. By putting the lid on this aspect of the decision, I think we can prevent additional cost increases.

26. There is an additional problem which evolved from a constructive design change.

27. My program office suggested the desirability of a built-in, diagnostic test apparatus for the transmitter section of the radio, and the contractor took it as "gospel."

28. The design change that the contractor proposed would add an additional 12 percent cost to each unit.

29. After some negotiations we agreed that he would submit the test apparatus as a proposed modification rather than a pre-production design change.

30. Because of the confusion over this incident, our timetable has slipped by nearly a week.

31. In an effort to remeet our time schedule, I've requested that the contractor make up the shortage with overtime. I estimate that this action will cause an increase of labor costs over the next two months by 14 percent.

32. Looking at the big picture, I'm pleased with this program.

33. A few details must still be corrected,

34. but when the rough edges are off, I'm certain that we'll have a model program in force that will offer an outstanding product to our tactical forces.

35. The reliability aspect should fall in line as soon as the overheating problem is corrected.

36. The ease of maintenance of the unit will no doubt suffer somewhat with modifications that we must make,

37. but it should be a radio man's dream in comparison with existing systems.

38. There are certain to be a few cost overruns,

39. but I'm positive that they'll be in line of reason when one considers the quality of the product we are procuring.

APPENDIX D

INSTRUCTIONS FOR CLASSIFICATION SURVEY

COMMUNICATION CLASSIFICATION SURVEY

A. General Instructions

This survey will be used to classify information as to favor and importance for use in a thesis experiment. Your cooperation is greatly appreciated.

B. Specific Instructions

1. Read the case study written in Part C of this survey booklet and then read the items of information itemized in Part D. These items of information are the possible choices that the subordinate (identified in the case by the pronoun "you") has at his disposal to forward to his supervisor.

2. Given the case situation, identify each item of information as to its favor to the subordinate and importance to the supervisor. Use the following scale to make your choice:

		Importance to Supervisor	
		Important	Not Important
Favor to Subordinate	Not Unfavorable	A-1	A-2
	Unfavorable	B-1	B-2

Thus, if you perceive an item of information to be favorable to the subordinate but unimportant to the supervisor,

mark A-2 in the space before that item. Utilize the following definitions in your analysis:

1) Not unfavorable: will not reflect unfavorably on the subordinate

2) Unfavorable: will detract from the supervisor's perception of the subordinate

3) Important: relevant information to the case and beneficial to the knowledge of the supervisor

4) Not important: irrelevant information that does not inform the supervisor

3. After you have classified each item of information, return your survey booklet to Joe Boyles or Harvey Wicker. Please do not discuss this instrument with anyone.

Thank you.

APPENDIX E

DATA COLLECTION PLAN

DATA COLLECTION PLAN

GROUP E		EXPERIMENTERS	SUBJECT A	SUBJECT B
R_{E1}	1.	Selection of randomized groups and dyads (consistent with "unawareness" constraints)		
	2.	R_{E1} and experimenter meet		
	3.	Instructions (Steps 4 & 5)		
	4.	Assignment of roles	Supervisor ($R_{E1}A$)	Subordinate ($R_{E1}B$)
X	5.	Treatment: Awareness	Introduction of Independent Variable	
	6.	Instructions (Steps 7, 8, & 9)		
	7.	Distribute posttest instrument		
O_1	8.		Role Playing and Posttest Evaluation	
F_1	9.		Feedback Session	
	10.	End experiment and dismiss subjects		

GROUP C		EXPERIMENTERS	SUBJECT A	SUBJECT B
R_{C1}	1.	Selection of randomized groups and dyads (consistent with "unawareness" constraints)		
	2.	R_{C1} and experimenter meet		
	3.	Instructions (Steps 4, 5, 6, & 7)		
	4.	Assignment of roles	Supervisor ($R_{C1}A$)	Subordinate ($R_{C1}B$)
	5.	Distribute posttest instrument		
O_1	6.		Role Playing and Posttest Evaluation	
F_1	7.		Feedback Session	
	8.	Random assignment of dyad to R_{E2} or R_{C2}		

		EXPERIMENTERS	SUBJECT A	SUBJECT B
SUBGROUP E				
R_{E2}	1.	Instructions (Steps 2 & 3)		
	2.	Retain roles	Supervisor ($R_{E2}A$)	Subordinate ($R_{E2}B$)
X	3.	Treatment: Awareness	Introduction of Independent Variable	
	4.	Instructions (Steps 5 & 6)		
	5.	Distribute posttest instrument		
O_2	6.		Role Playing and Posttest Evaluation	
	7.	End experiment and dismiss subjects		
SUBGROUP C				
R_{C2}	1.	Instructions (Steps 2, 3, 4, & 5)		
	2.	Retain roles	Supervisor ($R_{C2}A$)	Subordinate ($R_{C2}B$)
	3.	Distribute posttest instrument		
O_2	4.		Role Playing and Posttest Evaluation	
	5.	End experiment and dismiss subjects		

APPENDIX F

EXPERIMENTAL SETTING

For all except the last ten cases, a room approximately twenty feet by fifteen feet was used to administer the treatment and posttests for each individual dyad. The room contained an executive desk with an executive chair and a straight back chair positioned in front of the desk. The desk top held only a nameplate for the supervisor. For the last ten dyads, a small conference room (ten feet by seven feet) was used. A table with the nameplate displayed was used with two straight back chairs for the experiment.

The dyads were scheduled for treatment and/or posttest at their convenience, and only one dyad was treated and/or posttested at any one time. After an informal introduction between the members of the dyad and the experimenters, the dyad was administered a treatment and/or posttest depending upon random assignment to the control or experimental group. During the treatment, the dyadic members were requested to sit facing one another at a distance of approximately four feet. The desk/table was not used for this portion of the exercise. In the posttest, one dyad member was randomly designated as the supervisor, and the other member was designated as the subordinate. To emphasize the difference in role, the dyad members were required to wear small blue vests which had insignia of rank on the shoulders. In both posttests, the supervisor

was designated a lieutenant colonel, and the subordinate was designated a captain. The supervisor and the subordinate received separate and different instructions (see Appendices B & C). The different instructions prevented the supervisor from learning all the information about the pending report by the subordinate. The supervisor was positioned behind the desk/table, and the subordinate was seated directly in front of the desk/table.

After the supervisor requested a report from the subordinate, the subordinate left the room and prepared the report in a separate room with no fixtures other than a desk and a chair. The report was prepared by circling the numbers of the items of information being communicated to the supervisor (see Part D of Appendices B and C). While the subordinate prepared the report, the supervisor was requested to remain seated behind the executive desk. When the report was completed, the subordinate returned to the room and presented an oral report to the supervisor by stating the selected items of information. This report represented the collection of data necessary to test the first statistical hypothesis. The dyad members were allowed a five minute feedback session to permit the supervisor (if he chose to) to ask the subordinate questions about the report. At the termination of the feedback session, the experimental group was dismissed. The control group was then subdivided into experimental and control subgroups.

For those dyads selected for the second experiment, a treatment and/or second posttest was given after the five minute feedback sessions. The physical setting for the second experiment was the same as the first experiment.

Immediately after the experiment, the participants were debriefed on the purpose of the treatment and the posttests. They were requested not to discuss the experiment with others.

APPENDIX G

CLASSIFICATION RESULTS

Table 10

Instrument 1(O_1) Classification Survey Tabulation
(Number based on Frequency of Response)

	Not Unfavorable (A)		Unfavorable (B)	
Item	Important (1)	Not Important (2)	Important (1)	Not Important (2)
1	14	11	1	4
2	12	13	3	2
3	15	8	7	0
4	15	4	7	4
5	8	13	7	2
6	8	0	19	3
7	18	3	7	2
8	13	2	12	3
9	8	0	18	4
10	11	4	14	1
11	13	5	11	1
12	8	1	21	0
13	10	5	13	2
14	7	6	12	5
15	3	9	14	4
16	5	2	21	2
17	11	5	8	6
18	18	8	1	3
19	4	3	16	7
20	9	10	5	6
21	22	6	2	0
22	14	5	7	4
23	7	13	10	0
24	3	3	21	3
25	4	5	13	8
26	9	17	3	1
27	9	6	10	5
28	9	1	15	5
29	5	8	8	9
30	7	4	16	3
31	10	17	3	0
32	11	2	14	3
33	23	3	3	1
34	24	2	3	1
35	5	0	25	0

Table 11

Instrument 2(O_2) Classification Survey Tabulation
(Number based on Frequency of Response)

	Not Unfavorable (A)		Unfavorable (B)	
Item	Important (1)	Not Important (2)	Important (1)	Not Important (2)
1	13	12	4	1
2	17	5	8	0
3	15	14	0	1
4	13	14	1	3
5	24	1	4	0
6	23	5	1	1
7	18	10	1	1
8	21	2	7	0
9	22	1	6	1
10	18	2	10	0
11	17	2	11	0
12	18	1	11	0
13	14	6	7	3
14	15	11	0	4
15	21	8	1	0
16	13	16	1	0
17	19	11	0	0
18	17	5	5	3
19	8	0	22	0
20	5	1	23	1
21	8	6	8	8
22	13	7	9	1
23	11	8	8	3
24	19	10	1	0
25	18	7	5	0
26	13	3	10	4
27	4	2	20	4
28	6	0	24	0
29	12	4	10	4
30	3	0	24	3
31	4	0	26	0
32	4	15	1	10
33	4	19	1	6
34	3	22	0	5
35	18	8	2	2
36	7	3	17	3
37	4	24	0	2
38	5	2	16	7
39	6	14	2	8

Table 12

Classification of Items in Instrument 1(O_1)

Item	UNF (B)	NUNF (A)	IMP (1)	NIMP (2)	UNFIMP (B1)
1		X			
2		X			
3		X	X		
4		X	X		
5		X			
6	X		X		X
7		X	X		
8			X		
9	X		X		
10			X		
11			X		
12	X		X		X
13			X		
14			X		
15					
16	X		X		X
17			X		
18		X			
19	X		X		X
20		X			
21		X	X		
22		X	X		
23		X			
24	X		X		X
25	X				
26		X			
27			X		
28	X		X		
29					
30	X		X		
31		X			
32			X		
33		X	X		
34		X	X		
35	X		X		X
Total	10	15	24	0	6

Table 13

Classification of Items in Instrument $2(O_2)$

Item	UNF (B)	NUNF (A)	IMP (1)	NIMP (2)	UNFIMP (B1)
1		X			
2		X	X		
3		X			
4		X			
5		X	X		
6		X	X		
7		X	X		
8		X	X		
9		X	X		
10		X	X		
11		X	X		
12		X	X		
13		X	X		
14		X			
15		X	X		
16		X			
17		X	X		
18		X	X		
19	X		X		X
20	X		X		X
21					
22		X	X		
23		X	X		
24		X	X		
25		X	X		
26			X		
27	X		X		X
28	X		X		X
29			X		
30	X		X		X
31	X		X		X
32		X		X	
33		X		X	
34		X		X	
35		X	X		
36	X		X		
37		X		X	
38	X		X		
39		X		X	
Total	8	28	28	5	6

APPENDIX H

ONEWAY ANOVA SUM OF SQUARES DATA

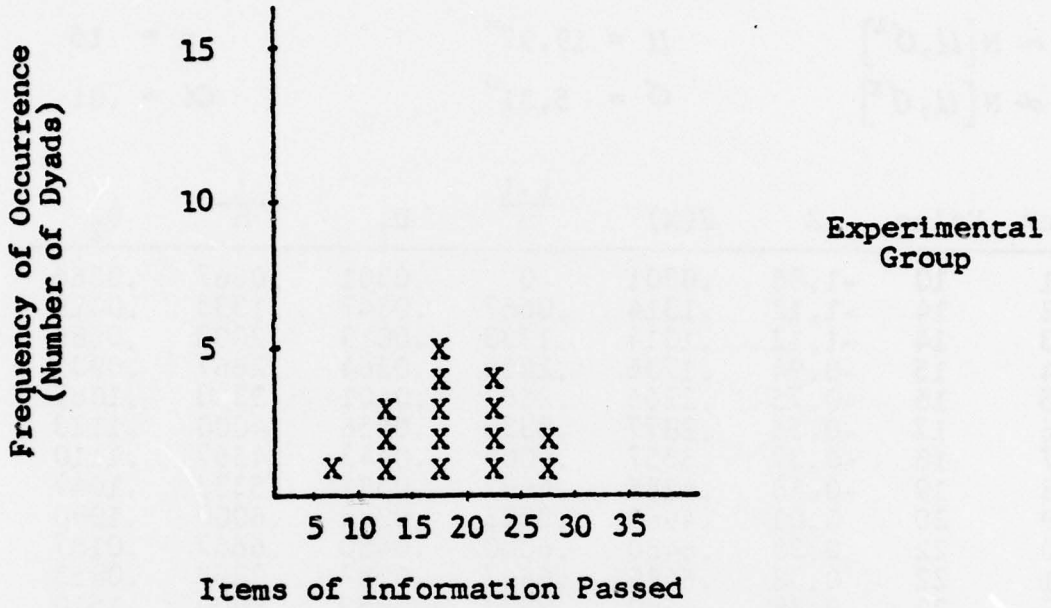
Types of Comparison	Posttest	Sources	Degrees of Freedom	Sum of Squares	Mean Squares	F-Ratios	F-Probabilities
NUNF	O_1	Between Groups	1	8.7111	8.7111	0.855	0.363
		Within Groups	43	437.8667	10.1829		
		Total	44	446.5778			
NUNF	O_2	Between Groups	1	119.9999	119.9999	2.757	0.104
		Within Groups	28	1218.8000	43.5286		
		Total	29	1338.8000			
IMP	O_1	Between Groups	1	0.0444	0.0444	0.003	0.911
		Within Groups	43	652.4000	15.1721		
		Total	44	652.4445			
IMP	O_2	Between Groups	1	112.1333	112.1333	3.654	0.163
		Within Groups	28	859.3334	30.6905		
		Total	29	971.4667			
TOTAL PASSED	O_1	Between Groups	1	3.2112	3.2112	0.110	0.738
		Within Groups	43	1254.5667	29.1760		
		Total	44	1257.7778			
TOTAL PASSED	O_2	Between Groups	1	124.0333	124.0333	2.120	0.153
		Within Groups	28	1638.1333	58.5048		
		Total	29	1762.1666			
NIMP	O_2	Between Groups	1	0.3000	0.3000	0.115	0.734
		Within Groups	28	73.0667	2.6095		
		Total	29	73.3667			

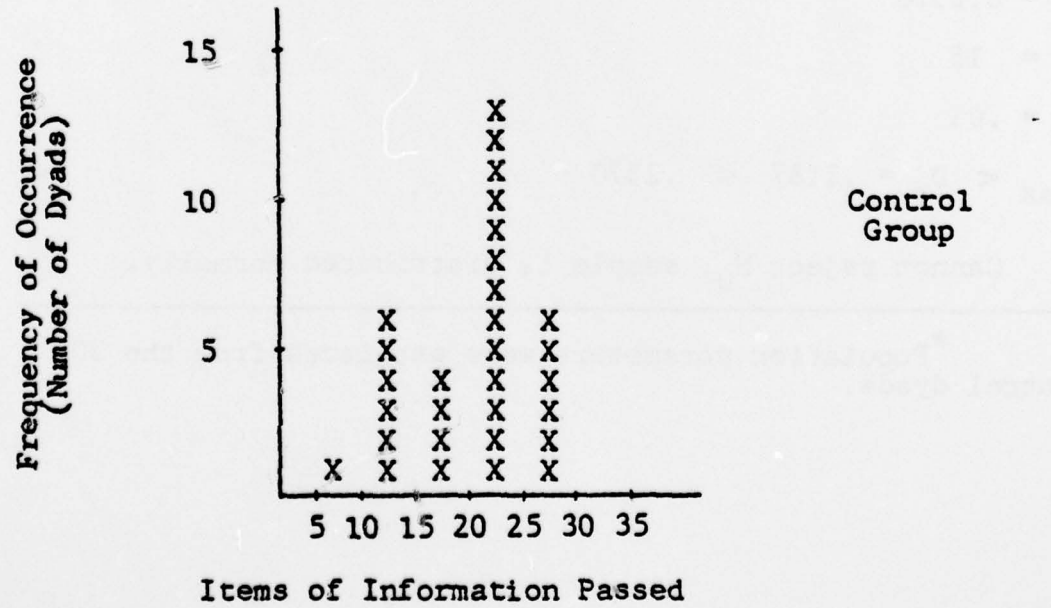
Types of Comparison	Posttest	Sources	Degrees of Freedom	Sum of Squares	Mean Squares	F-Ratios	F-Probabilities
UNFIMP	O_1	Between Groups	1	0.2778	0.2778	0.168	0.685
		Within Groups	43	70.9667	1.6504		
		Total	44	71.2444			
UNFIMP	O_2	Between Groups	1	0.3000	0.3000	0.147	0.704
		Within Groups	28	57.0667	2.0381		
		Total	29	57.3667			
UNF	O_1	Between Groups	1	0.4000	0.4000	0.104	0.744
		Within Groups	43	164.8000	3.8326		
		Total	44	165.2000			
UNF	O_2	Between Groups	1	3.3333	3.3333	1.084	0.308
		Within Groups	28	86.1333	3.0762		
		Total	29	89.4667			
UNF / TOTAL PASSED	O_1	Between Groups	1	12.8442	12.8442	0.147	0.703
		Within Groups	43	3751.4668	87.2434		
		Total	44	3764.3110			
UNF / TOTAL PASSED	O_2	Between Groups	1	100.8333	100.8333	0.911	0.350
		Within Groups	28	3098.1333	110.6476		
		Total	29	3198.9668			
UNFIMP / UNF	O_1	Between Groups	1	466.9453	466.9453	1.410	0.240
		Within Groups	43	14240.0332	331.1636		
		Total	44	14706.9785			

Type of Comparison	Posttest	Sources	Degrees of Freedom	Sum of Squares	Mean Squares	F-Ratios	F-Probabilities
UNF IMP / UNF	O_2	Between Groups	1	120.0000	120.0000	0.300	0.595
		Within Groups	28	11203.4668	400.0000		
		Total	29	11323.4668			
NUNF / TOTAL PASSED	O_1	Between Groups	1	84.0996	84.0996	0.567	0.462
		Within Groups	43	6376.7002	148.2954		
		Total	44	6460.7998			
NUNF / TOTAL PASSED	O_2	Between Groups	1	403.3330	403.3330	1.978	0.167
		Within Groups	28	5710.5332	203.9476		
		Total	29	6113.8662			
IMP / TOTAL PASSED	O_1	Between Groups	1	14.3984	14.3984	0.134	0.715
		Within Groups	43	4622.8008	107.5070		
		Total	44	4637.1992			
IMP / TOTAL PASSED	O_2	Between Groups	1	12.0332	12.0332	0.108	0.741
		Within Groups	28	3118.6660	111.3809		
		Total	29	3130.6992			
TOTAL PASSED / TOTAL POSS	O_1	Between Groups	1	22.5000	22.5000	0.094	0.754
		Within Groups	43	10274.6992	238.9465		
		Total	44	10297.1992			
TOTAL PASSED / TOTAL POSS	O_2	Between Groups	1	896.5332	896.5332	2.251	0.141
		Within Groups	28	11154.1330	398.3619		
		Total	29	12050.6670			

APPENDIX I

GRAPHICAL PLOTS AND THE KOLMOGOROV-SMIRNOV TEST


Frequency of Occurrence
(Number of Dyads)
15
10
5
5 10 15 20 25 30 35
Items of Information Passed
Experimental
Group


Frequency of Occurrence
(Number of Dyads)
15
10
5
5 10 15 20 25 30 35
Items of Information Passed
Control
Group

KOLMOGOROV-SMIRNOV TEST

$H_0 \sim N[\mu, \sigma^2]$ $\mu = 19.97^*$ $n = 15$

$H_1 \nsim N[\mu, \sigma^2]$ $\sigma = 5.31^*$ $\alpha = .01$

Rank	Value	Z	F(X)	$\frac{i-1}{n}$	D_1	$\frac{i}{n}$	D_2
1	10	-1.88	.0301	0	.0301	.0667	.0366
2	14	-1.12	.1314	.0667	.0647	.1333	.0019
3	14	-1.12	.1314	.1333	.0019	.2000	.0686
4	15	-0.94	.1736	.2000	.0264	.2667	.0931
5	16	-0.75	.2266	.2667	.0401	.3333	.1067
6	17	-0.56	.2877	.3333	.0456	.4000	.1123
7	18	-0.37	.3557	.4000	.0443	.4667	.1110
8	19	-0.18	.4286	.4667	.0381	.5333	.1047
9	20	0.01	.4960	.5333	.0373	.6000	.1040
10	22	0.38	.6480	.6000	.0480	.6667	.0187
11	22	0.38	.6480	.6667	.0187	.7333	.0853
12	22	0.38	.6480	.7333	.0853	.8000	.1520
13	22	0.38	.6480	.8000	.1520	.8667	.2187
14	30	1.89	.9706	.8667	.1039	.9333	.0373
15	30	1.89	.9706	.9333	.0373	1.0000	.0294

$D_c = 0.2570$

$n = 15$

$\alpha = .01$

$D_{max} < D_c = .2187 < .2570$

Cannot reject H_0; sample is distributed normally.

*Population parameters were estimated from the 30 control dyads.

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